Assessing the food security status of households participating in community gardens in the Maphephetheni Uplands determined by the Household Food Insecurity Access Scale

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ABSTRACT

While South Africa is nationally food secure, the majority of rural households are food insecure. Community and home gardens are widely promoted to alleviate food insecurity. Households in the Maphephetheni Uplands, KwaZulu-Natal have come together to cultivate community gardens, producing food crops for consumption and selling surpluses. This study evaluated the contribution of community gardens towards alleviating food insecurity in the Maphephetheni Uplands. A survey was conducted among 53 participants of community gardens and their households. A questionnaire and focus group discussions were used to evaluate the following household food security measures: anxiety and uncertainty about food supply; consumption of a variety of preferred foods; consumption of sufficient quantities of food; and the prevalence of food insecurity. Eighty percent of the participating households had insufficient food intake, 72% consumed food of inadequate quality and 89% were anxious and uncertain about food supplies. Among the households surveyed using the Household Food Insecurity Access Scale, 88.7% were categorised as severely food insecure, often going a day without eating, going to bed hungry or running out of food for more than ten days in a month. Eight percent of households were moderately food secure, and three percent were mildly food insecure. No households were food secure according to the classification. Only 11% of the household food was sourced from community gardens, while 83% was purchased and six percent was sourced from home gardens. Limited community garden sizes, drought, floods, theft, pests and diseases were identified by community gardeners as factors limiting the contribution of community gardens to household food security. Community gardens have not alleviated food insecurity among the participating households. It is recommended that an investigation should be carried out on how productivity could be improved through appropriate crop husbandry practices to reduce crop loses. Since purchasing is the main source of food among community gardeners, alternative income generating activities need to be investigated.

DECLARATION

I hereby declare that the research report in this dissertation is of my own investigation. Where use has been made of the work of others, this has been duly acknowledged in the text.

Signed_____ **_____**

Stephen Odede Shisanya **Date**

As research supervisor I agree to submission of this dissertation for examination:

Signed_____ **_____**

Prof Sheryl Hendriks **Date**

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LIST OF ABBREVIATIONS

ACFCGN	Australian City Farms and Community Gardens Network
AFSIC	Alternative Farming Systems Information Centre
AIDC	Alternative Information and Development Centre
BHC	Better Health Care
DBSA	Development Bank of Southern Africa
EDIAIS	Enterprise Development Impact Assessment Information Service
EEA	European Evaluation Agency
FANTA	Food and Nutrition Technical Assistance
FAO	Food and Agriculture Organization
FPMC	Food Price Monitoring Committee
HFIAP	Household Food Insecurity Access Prevalence
HFIAS	Household Food Insecurity Access Scale
HFIS	Household Food Insecurity Scale
HIV /AIDS	Human Immunodeficiency Virus/ Acquired Immune-deficiency Syndrome
HSRC	Human Sciences Research Council
IFPRI	International Food Policy Research Institute
IITA	International Institute of Tropical Agriculture
IPCC	Intergovernmental Panel on Climate Change
KIDS	KwaZulu-Natal Income Dynamics Study
NDA	National Department of Agriculture
NEPAD	New Partnership for Africa's Development
PVO	Private Voluntary Organizations
REP	Rural Enterprise Promotion
SSA	Statistics South Africa
UN	United Nations
UNDP	United Nations Development Program
US HFSSM	United States Household Food Security Survey Measure
USAID	United States Agency for International Development
WFS	World Food Summit

CHAPTER 1

THE PROBLEM AND ITS SETTING

1.1 Background information

Agriculture has played a key role in poverty alleviation, kick-starting economic growth and reducing poverty and hunger in many developing countries (International Food Policy Research Institute (IFPRI), 2005). Countries failing to launch an agricultural revolution remain trapped in poverty, hunger, and economic stagnation (IFPRI, 2005). Food security policies should therefore be guided by a holistic approach emphasising poverty reduction at household level and economic development and growth as important components with specific attention to the contribution of agriculture (Van Rooyen, 2000). However, other factors such as low agricultural productivity; low household incomes; high food prices; inappropriate land tenure systems; and Human Immunodeficiency Virus / Acquired Immune-deficiency Syndrome (HIV /AIDS) pandemic combine to exacerbate low agricultural production and food insecurity in rural areas. Agricultural production can broadly be classified into small scale and commercial agriculture depending on the scale and objective of production (Hart & Milstein 1999). Although a size-based definition of small scale agriculture does not consider intensity of production, small scale agriculture in this study is defined as farms of less than two hectares of owned or rented land with the farm-family as the main source of labour and farming as one of the key contributors to family income (Nagayets, 2005).

Small-scale farming coupled with the use of appropriate agricultural production technologies such as high yielding varieties, soil fertility enhancers and bio-fortification of stable crops are more efficient food producers in labour surplus economies and help contain food insecurity in the rural areas (Hazell & Diao, 2005). It is estimated that 33 million small farms exist in Africa, constituting 80% of all farms in the region (Nagayets, 2005). A variety of small scale farming systems exist in Africa, the most common ones include community and home gardening (Faber et al, 2002). Implementation of community gardens in Africa as a food insecurity

intervention has reached significant proportions in rural areas, though their impact and relative cost-effectiveness are not clear (IFPRI, 2007).

Community gardens can enhance household food security through direct access to diverse nutritional foods; increased purchasing power from savings on food bills; income from sale of excess produce; and provision of food stocks during seasonally lean periods (Food and Agriculture Organization (FAO), 2001a). Measurement of the impact of community gardens on household food insecurity is important in guiding, monitoring and evaluating the extent of food insecurity. Households in the Maphephetheni Uplands of KwaZulu-Natal have formed ten community gardens, of which seven are functional, producing a variety of crops for both household consumption and sale. The contribution of these community gardens towards alleviating individual household food security has not previously been measured.

1.2 Importance of the study

In South Africa, the number of people falling below the poverty line (incomes of less than R354 per month per adult equivalent) increased over the period 1999 – 2002 with 'new' poor people estimated at 4.5 million (Meth & Dias, 2004). Meth and Dias (2004) speculated that the number of food insecure households could increase unless sustainable interventions to alleviate food insecurity are implemented. Past apartheid policies of segregation and discrimination have left a legacy of inequality and poverty among the rural communities in South Africa (Woolard, 2002). Approximately 65% of the poor reside in rural areas and 78% are likely to be chronically poor (Machethe, 2004). In 2000, about 8 million South Africans were surviving on less than one dollar per day poverty line and 18 million were living on less than 2 dollars per day (United Nations Development Program (UNDP), 2003). The Human Development Index in South Africa worsened from 0.73 in 1994 to 0.67 in 2003 and by 2002, poverty had engulfed 48.5% of the population (21.9 million) (UNDP, 2003). Income inequality increased from 0.60 in 1995 to 0.63 in 2001 and the majority of households in rural areas still have limited access to basic services (UNDP, 2003). The official unemployment rate increased sharply to more than 30% in 2003 (UNDP, 2003). Although absolute poverty and the poverty gap declined between 1995 and 2002 from 51.1% to 48.5% of the population, using the national poverty line of R354 per adult

per month, the population grew in the same period—thus increasing the number of poor from 20.2 million in 1995 to 21.9 million in 2002 (UNDP, 2003). In 1998, South Africa's poorest 40% of households (equivalent to 50% of the population) received only 11% of the national total income, while the richest 10% of households (equivalent to only 7% of the population) received over 40% of total national income (May, 1998).

Machethe (2004) observed that since the majority of people in developing countries reside in rural areas and are engaged directly or indirectly in agricultural activities, agriculture could be the most effective way to reduce rural poverty and hence food insecurity. Small-scale agriculture has been the principal engine of development in rural areas, and small-scale agricultural units have achieved higher returns to land and capital over time than large-scale agricultural operations (Delgado, 1997). Agricultural production activities in rural areas could increase rural incomes; promote non-farm activities such as spaza and barber shops through creation of demand for goods and services; and break the cycle of rural poverty (Pinstrup-Andersen & Pandya-Lorch, 1995; Hemson et al, 2004).

Ngqangweni (1999) observed that increasing small-scale agricultural production through community and home gardens can boost household food availability and increase household access to a variety of foods from increased purchasing power through home-grown food sales. Rapid progress in food security can be achieved by establishing independent rural community-based groups capable of organising development initiatives and taking responsibility for program implementation (FAO, 2004; Jayne et al, 2005). Community gardens may diversify the local food base, generate income, and contribute to household members' nutritional status (FAO, 2002a; Ruel & Levin, 2000).

1.3 Statement of the research problem

KwaZulu-Natal is the third poorest province in South Africa, contributing 15.5% to the national poverty gap (National Department of Agriculture and Land Affairs, 2005). Of KwaZulu-Natal's population, 50.5% fell below the national poverty line (households with incomes less than R354 per month per adult equivalent) in 1995

compared to 53.2% in 2002 (UNDP, 2003). Community gardens have been established in rural KwaZulu-Natal to address food insecurity, but their contribution has not yet been documented. The purpose of this study is to establish how many households participating in community gardens in the Maphephetheni Uplands (rural area of KwaZulu-Natal) are food secure as determined by the Household Food Insecurity Access Scale (HFIAS).

1.4 Research objective

To assess the food security status of households participating in community gardens in the Maphephetheni uplands.

1.5 Sub problems

The specific sub problems to be addressed about households in the Maphephetheni Uplands participating in community gardens are:

Sub-problem 1: Is there anxiety and uncertainty about household food supply among community gardeners in the Maphephetheni Uplands?

Sub-problem 2: Do households participating in community gardening in the Maphephetheni Uplands consume a variety of preferred foods?

Sub-problem 3: Do households participating in community gardening in the Maphephetheni Uplands consume sufficient quantities of food?

Sub-problem 4: What is the prevalence of food insecurity among community gardeners in the Maphephetheni Uplands as measured by the Household Food Insecurity Access Scale?

1.6 Study limitations

This study concerns only the seven community garden groups that were active in the Maphephetheni Uplands at the time of the study. The results may not be generalised to other community garden groups in and beyond the Maphephetheni Uplands. The study aimed to measure the food security status of members of community gardens and thus performance of individual community garden groups was not explored. Due to resource constraints, an assessment of the contribution of community gardens to the food utilisation component of food security was not investigated. Although all households participating in community gardens in the Maphephetheni uplands were invited to the survey, only 44% of households turned up. This low turn up by households was inadequate for an interview survey and may have some influence on data analysis and interpretation of results. Due to limited resources, group-administered questionnaires were used to collect data, with each respondent completing an individual questionnaire. Although individual questionnaires were completed by respondents, influence from peers in a group may not be ruled out as in a case where an individual fails to ask clarity of a question due to fear of peers in the group. Completing a question that is not well understood may lead to a respondent giving an inappropriate answer and this may impact negatively on the results of the study.

1.7 Study assumptions

It was assumed that: the recall period (one month prior to data collection date) was representative of a normal month in the Maphephetheni Uplands; the participants would have reliable recall of issues relevant to the study; information given was representative of their respective households; data obtained from participants was reliable and true; and respondents did not withhold information. The materials and methods used during data collection were assumed to be adequate in capturing information on quality and quantity of food consumed and household anxiety and uncertainty about food supply among households in the Maphephetheni Uplands. It was assumed that the HFIAS tool used in the study gave an accurate indication of the level of food security of the households surveyed.

1.8 Organisational structure of the dissertation

Chapter one has outlined the background of the research problem, the importance of the study, the statement of the research problem, the research hypothesis, the sub-problems, the study limitations and the study assumptions. Chapter two gives a review of literature related to the study. Chapter three gives a description of the study area. Chapter four describes the methodology used in the study. Results and discussion are addressed in chapter five. Conclusions and recommendations are presented in chapter six.

CHAPTER 2

LITERATURE REVIEW

Despite South Africa's self sufficiency with regard to food production, food insecurity exists (National Treasury, 2003; Charlton & Rose, 2002). It was estimated that by 2001, more than 14 million people or about 35% of South Africa's population were vulnerable to food insecurity and more than one quarter of children under the age of six years were stunted due to malnutrition (Human Sciences Research Council (HSRC), 2004). In showing government commitment to food security, the South African Constitution (Chapter 2 section 27.1b) asserts that every citizen has the right to access sufficient food and water, and the government should take appropriate legislative measures to realise this objective (HSRC, 2004).

Maxwell et al (2003) observed that food security is complex and entails a range of factors and elements that affect food supply, access, adequacy, utilisation, safety and cultural acceptability. Agricultural interventions are thought to contribute to food security in several ways including direct supply of crops and/or animal based foods for consumption, creation of employment opportunities and access to other non-farm foods through farm produce incomes (Bonnard, 2001). Agricultural interventions could have direct impacts on food security by encouraging diversification of production systems through community gardening, home gardening, intercropping and introduction of high value crops (Bonnard, 2001).

Without knowing the extent of food insecurity or food security trends over time, there is little hope of effective policies and targeted programmes to address food insecurity in South Africa (UNDP, 2003; Carletto et al, 2001). Specific knowledge about vulnerable groups and their economic characteristics in terms of location, extent and characteristics is needed for accurate targeting to improve household food security (Motloung & Mears, 2002).

This review explores the current food security situation in South Africa, considers the causes of food insecurity in South Africa and shows how agriculture underpins food

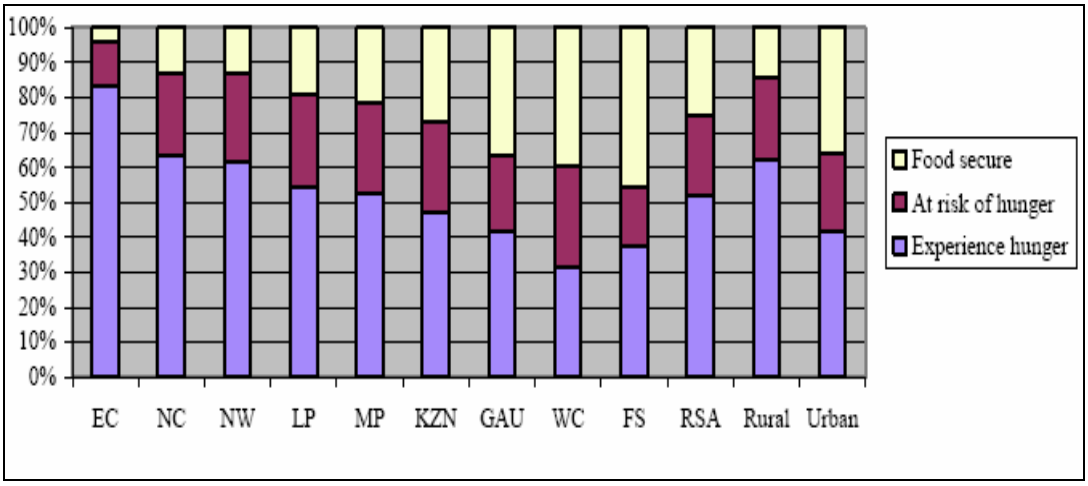
insecurity interventions, with a specific focus on community gardening. Food security programmes in South Africa focussing on agricultural production are examined. The review includes a discussion on measurement of agricultural production impact on food security and identifies the Household Food Insecurity Access Scale (HFIAS) as a current and effective tool for measuring food security.

2.1 Poverty and food security in South Africa and KwaZulu-Natal

Food security is multidimensional and its measurement and understanding is complex (Maxwell et al, 2003). In 1999, there were approximately 200 definitions and 450 indicators of food security (Hoddinot, 1999). Development agencies used to measure food security at national level, which later shifted to household level measures and with time, measurement of food security has emphasised individual food security (World Food Summit (WFS), 1996). Concerns of individual food security have caused the South African government to entrench in its constitution that "every citizen has the right to access sufficient food and water and that the state by legislation and other measures, within its available resources, avail to progressive realization of the right to sufficient food" (National Department of Agriculture (NDA), 2002:5).

May (1998) reported that in 1995 in South Africa, about 18 million people lived in the poorest 40% of households and were classified as 'poor', households living on incomes of less than R352 per month per adult equivalent and 10 million people lived in the poorest 20% of households and were classified as 'ultra poor', households with incomes of less than R194 per month per adult equivalent. The poverty gap measured by the annual amount needed to uplift the poor to the poverty line by means of a perfectly-targeted transfer of money, and measures the depth of poverty was about R28 billion in 1995 (May, 1998). 76% of the poverty gap was accounted for by the rural areas (May, 1998). In 1999, approximately 70 % of South Africa's poorest households lived in rural areas and more than 80% of children aged 1-9 years in rural areas were at risk of hunger or had experienced hunger (Labadarios & Nel, 2000). In 1999, about 21.6% of children aged 1-9 years were affected by stunting, a low height for age ratio due to under-nutrition while 3.7% suffered from wasting, a low weight for height ratio (Labadarios & Nel, 2000).

In South Africa, in 1995, three children in five lived in poor households and the poverty rate in female headed households was 60% compared with 31% for male headed households (May,1998). Absolute poverty and the poverty gap marginally declined from 51.1% (1995) to 48.5% (2002), but with population growth over the same period, the number of poor people increased from 20.2 (1995) to 21.9 million (2002) (UNDP, 2003). Data analysis from 1999 – 2002 showed that the number of people in the bottom two expenditure classes (R0- R399 and R400- R799 per household per month) increased by about 4.2 million, suggesting that the number of poor people had increased (Meth & Dias, 2004). Of the most impoverished sectors of the population, blacks generally resident in the rural areas, constituted 91.1% of the 21.9 million poor South Africans (UNDP, 2003). Figure 2.1 shows South African hunger risk classification by province, rural and urban areas for children aged 1-9 years and shows that in 1999, rural areas had more than 80% of children aged 1-9 years experiencing hunger or at risk of hunger.



Key: EC= Eastern cape, NC= Northern cape, NW= North west, LP= Limpopo, MP= Mpumalanga, KZN= KwaZulu-Natal, GAU= Gauteng, WC= Western cape, FS= Free state, RSA= Republic of South Africa

Figure 2.1: South Africa's 1999 provincial hunger risk classification of children aged 1-9 years (Labadarios & Nel 2000:28).

It was estimated that 50.5% of KwaZulu-Natal's population fell below the national poverty line (R354) in 1995 compared to 53.2% in 2002 (UNDP, 2003). This shows that the number of poor people in the province had increased over time. The KwaZulu-Natal Income Dynamics Study (KIDS) indicated that malnutrition and

poverty in the province increased over the period of study (1994-1998) (Jinabhai et al, 2004). May (1998) reported that in rural KwaZulu-Natal, 21% of households observed in 1993 emerged in 1998, not only as poor, but as having fallen deeply into poverty implying that their ability to generate an income declined between the two periods.

2.2 Causes of food insecurity in South Africa

A number of interlinking factors contribute to food insecurity, creating structural vulnerability that exposes people to high levels of risk and stress, and undermines their ability to cope. Oxfam (2007) indicated that large parts of Southern Africa are chronically food insecure, meaning that millions do not have enough to eat even in a ‘good’ harvest year as a result of a series of 'entangled' causes such as economic stagnation, decreased formal employment opportunities, bad agricultural policies, adverse climatic factors, environmental degradation and the devastating impacts of HIV/AIDS. NDA (2002) listed the following as some of the causes of food insecurity in South Africa: inadequate safety nets, weak disaster management systems, weak support networks, inadequate and unstable household food production and lack of purchasing power. May (1998) added that major factors contributing to poverty and food insecurity in South Africa include: the impact of apartheid, which stripped people of their assets, especially land; distorted economic markets and social institutions; and undermined the asset base of individuals, households and communities. The South African agricultural sector is characterised by the dual nature of the sector in which 46000 largely white commercial farms occupied 87% the total agricultural land, while more than two million black households farm the remaining 13% of agricultural land causing increased food insecurity among the black households (Aliber, 2005). Contributing factors to food insecurity, such as death in a family could affect individual households while other factors such as drought, floods, or inflation affect communities beyond individual households (Bonnard 2001). The following section looks at some of the key factors contributing to food insecurity in rural South Africa.

2.2.1 Low agricultural production in rural homeland areas

The South African apartheid policies created “two agricultures.” The first was in the former homeland areas, which were largely neglected by the apartheid government and were backward and subsistence oriented; the second was in the so-called former white areas that were well developed, export oriented and well supported by government systems (Kristen & Moldenhaver, 2006). Not only have the former homelands in rural areas suffered from imbalanced distribution of land, but were also mostly located in marginally productive land and often experienced shortfalls in agricultural inputs, like capital, fertiliser, veterinary services and new agricultural technologies resulting in consistently low agricultural productivity (Wiebe et al, 2001). These households are net consumers of purchased food and typically rely on off-farm incomes to meet household food needs. NDA (2002) indicated that there is unstable household food production in the former homelands and households are often unable to feed themselves. Only 4% of households in South Africa derive incomes from agriculture with the greatest proportion of households (57%) deriving incomes from wages and salaries (HSRC, 2004).

One of the key challenges facing South Africa is to match incomes of people to prices of commodities in order to ensure access to sufficient food for every citizen (NDA, 2002). High dependence on food purchases increases household vulnerability to food insecurity due to commodity price fluctuations and diminishing wage incomes (Bonti-Ankomah, 2001). In South Africa, rural-urban migration has lowered the supply of productive labour in rural areas to such an extent that labour shortages during critical periods are experienced in agricultural production systems (Machethe, 2004). The New Partnership for Africa’s Development (NEPAD) (2003) indicated that low agricultural productivity could be due to poor and inappropriate technologies; use of low yielding varieties; poor use of fertilisers; declining soil fertility; poor agricultural support services and unsupportive government policies. Decreased agricultural productivity has also been associated with a declining number of adult food producers due to the HIV/AIDS pandemic (FAO, 2006).

2.2.2 HIV/AIDS pandemic

The South Africa HIV/AIDS pandemic has created many vulnerable households in South Africa (Table 2.1) resulting in rapidly eroded food and livelihood security and a decreased labour force; increased labour time spent caring for the sick; decreased experienced and skilled manpower through deaths; and increasing expenditure on medication and funeral expenses (HSRC, 2004). In the southern African region it is estimated that, on average, every income earner is likely to acquire one additional dependent over the next ten years due to the AIDS epidemic, with a predicted dramatic increase in destitute households (AVERTing HIV and Aids (AVERT), 2006).

Table 2.1: Demographic impact of HIV/AIDS in South Africa (UNAIDS, 2006:8)

HIV/AIDS impacts	Number affected	Percentage of population
Adults aged 15-19 HIV/AIDS, 2003	5,300,000	12.4
Adult HIV prevalence 2003	804,000	18.8
Women aged 15-49 with HIV/AIDS, 2003	3,100,000	7.2
Children with HIV/AIDS, 2003	240,000	0.6
AIDS deaths, 2003	320,000	0.7
AIDS orphans (aged 0-17)	1,200,000	2.8

Note: *Data generated by surveillance systems focussing on pregnant women attending sentinel antenatal clinics and nationally representative sero-surveys.*

HIV/AIDS will not only increase poverty but also widen the gap between the rich and poor. The sale of productive assets like cattle and land to meet medical and funeral costs reduces the chance of such households recovering and rebuilding their asset base after the passing away of the HIV infected relative (UNDP, 2003). AIDS has had a substantial negative impact on productivity of agricultural scientists and professionals through man-hours lost. For instance, in Kenya's Ministry of Agriculture, 58% of all staff deaths in the past five years (1998- 2003) were AIDS- related, while in Malawi's Ministry of Agriculture and Irrigation, at least 16% of the staff could be HIV-infected (Haggblade, 2004). A study from one district in Uganda estimated that 50% of agricultural extension staff time could have been lost due to HIV/AIDS related issues,

like death, recurrent illness and frequent absences required to care for the sick relatives and to attend funerals (Haggblade, 2004).

2.2.3 Food prices

Food prices in South Africa increased substantially in the second half of 2001 to the extent that the government focussed attention on the effect of price increases on low income households (Aliber & Modiselle, 2002). The food price index rose to 16.7% as compared to non food inflation of 7.2% in the year 2002 (Statistics South Africa (SSA), 2002). In the same year, poor households were confronted with a year-on-year price inflation of 23.1% with prices in the rural areas being generally higher than urban centres with large chains of super stores (Food Price Monitoring Committee (FPMC), 2002). Increased food prices, specifically maize meal was devastating for low income earners who typically spend more than one third of their income on food (Watkinson & Makgetla, 2002; HSRC, 2004). Food shortages in other southern African countries, for which relief is sourced mainly from South Africa, also reduced domestic supply and drove up food prices in South Africa, particularly during periods when South Africa had little or no surplus to export (Alternative Information and Development Centre (AIDC), 2005). Muellbauer & Smit (2003) suggested that exchange rates, wages, oil prices and terms of trade are the primary contributors to high inflation rates of South African food prices.

2.2.4 Low household incomes

In South Africa, many households in rural areas are involved in small-scale farming, but agriculture does not contribute more than 4% to their total income even though farming requires involvement by a considerable number of family members (AIDC, 2005). Continuously low incomes in rural areas of South Africa contributed to high levels of food insecurity. Available data in 2000 showed that 84% of households earned less than R2500 annually of which 62% were reported earnings of less than R1000 (Bonti-Ankomah, 2001). These incomes fall below the annual poverty lines of R4230 and R2335 representing poverty lines of the poor and ultra poor, respectively (May, 1998).

Since more than 80% of the rural population in South Africa were restricted to less than 13% of the land under apartheid, most black farmland, previously known as homelands were severely overused leading to soil erosion and low agricultural productivity that resulted in households seeking alternative sources of income from non-agricultural activities to supplement their livelihoods (AIDC, 2005). For unskilled employees, wages tend to be too low to sustain food requirements, accounting for 48% of total income, implying that livelihood strategies are limited (Bonti-Ankomah, 2001).

2.2.5 Land tenure systems

Most land in rural South Africa is characterised by traditional land tenure systems in which private land ownership is not allowed and farmers receive ‘permission to occupy’ from the tribal chief (Leroy et al, 2001). Apartheid land policies were a major source of insecurity, landlessness, poverty and food insecurity among the black community (HSRC, 2004). The central thrust of the current land policy in South Africa is a land reform programme dealing with aspects of land redistribution, land restitution, and land tenure with food security as one policy goal (Leroy et al, 2001). Rural households with land are less likely to be poor and food insecure than those with marginal holdings or without land (Mlambo, 2000). Food security in rural areas would be enhanced by implementing land reform programmes allowing land ownership (HSRC, 2004). Land ownership plays an important food security role in making households less reliant on purchased food, given that land ownership is an incentive to food production (HSRC, 2004).

2.3 Small scale agricultural production interventions for food security

Small scale agricultural production may be defined as farms confined to less than two hectares of owned or rented land, with farm-family as the main source of labour and farming as the principle source of family income (Nagayets, 2005). A major challenge facing Africa is to increase agricultural production and achieve sustainable economic growth, essential for improving household food security (Inter-governmental Panel on Climate Change (IPCC), 2001). Agricultural production interventions for food

security may include agricultural production policies and programmes, or actions intended to create identifiable food security outcomes (Better Health Care (BHC), 2003). In developing countries, most poor people live in rural areas and depend on agriculture for their livelihoods (Machethe, 2004). In 1999, 60% of the global population was rural and 85% of these depended on agriculture for their livelihood (FAO, 2001). With the majority of people living in rural areas and dependent on agriculture, agriculture could be thought of as the most effective way to address food insecurity. Agricultural production contributes directly to poverty and alleviation of food insecurity in rural areas by reducing food prices; creating employment; increasing real wages; and improving real incomes (Development Bank of Southern Africa (DBSA), 2005).

Although the contribution of agricultural production to poverty alleviation cannot be understated, the importance of non-farm activities needs to be recognised (Machethe, 2004). A risk management approach to household food insecurity alleviation should seek to minimise income and consumption variability, install effective safety nets against inevitable low-return years, and promote livelihood diversification (Devereux, 2003). The key to sustainable agriculture in rural areas lies in increased agricultural output per unit area together with arable land expansion (Tsubo et al, 2003). In a study by Machethe et al (2004) involving 138 rural farmers in the Lompopo Province, agriculture was the main contributor to food supply (Table 2.2). Agricultural production ensures physical availability of food and strengthens accessibility to food where livelihoods are agriculturally based, playing a complimentary role in food utilisation in terms of ensuring quality and diverse household food supply (Bonnard, 2001). BHC (2003) noted that agricultural production initiatives create new markets, opportunities for bartering skills and a focus for new social networks for rural residents.

Small-scale crop production is the mainstay of rural livelihoods in most developing countries and this could be a primary strategy in poverty alleviation and food insecurity in rural areas of developing countries (Dovie et al, 2003). Some of the small scale agricultural production systems widely used in Africa include community and home gardening (Faber et al, 2002).

Table 2.2: Sources of income and contribution to total household income in Limpopo (Machethe et al, 2004:4)

Income source	Average monthly income (R)	Contribution of total household income (%)
Farming	545	41.0
Pension	329	24.8
Wages	258	19.4
Remittances	165	12.4
Family business	19	1.4
Other non-farm income	13	1.0
Total	**1329**	**100**

2.3.1 Impacts of community gardens on household food security

A community garden consists of a community of individuals who pledge support to a farm operation so that the farmland becomes either legally or collectively, the community's farm, with the growers and consumers providing mutual support and sharing the risks and benefits of food production (Alternative Farming Systems Information Centre (AFSIC), 2007). The success of the gardens depends on the participants' willingness to share resources such as space, tools and water (Glover et al, 2005a). Mashinini (2001) pointed out that increased involvement of community members in collective action in the ownership and management of natural resources is the best route to sustainability, because it enables resource pooling and sharing to promote efficiency and equity in the utilisation of scarce resources.

Community garden participants' willingness to share resources is enhanced by the social connections they make during the shared acts towards operations (Glover et. al, 2005b). Community gardens may be more about *community* than they are about gardening as they offer places where people gather, network and identify together as residents of a neighbourhood endeavouring to join the community effort and work towards a common goal (Parry et al, 2005). The benefits of community gardens include accessing fresh nutritious foods; promotion of physical fitness; knowledge and expertise gains in growing plants; development of skills such as shared decision

making; problem solving and negotiation among gardeners and a place where gardeners build a sense of community (Australian City Farms and Community Gardens Network (ACFCGN), 2002).

Parry et al (2005) indicated that some of the intangible benefits of community gardens include:

- Psychological well being through positive aesthetic environmental changes; community gardeners gain a sense of pride and accomplishment, which in turn fosters feelings of self worth and self confidence.
- Gains from growing food independently are that gardeners are relieved of purchasing vegetables or fruits from commercial sources which creates a sense of self reliance.
- Opportunities arise for disenfranchised individuals to join community group efforts as an active member and to take on leadership roles to work towards collective goals.

ACFCGN (2002) reported that in East Timor, women from 121 families worked in community gardens and produced mustard, tomato and egg plant that provided food for household consumption; the excess was sold, consequently increasing purchasing power and effectively addressing household food insecurity. Community gardens in Lesotho established in the 1960s improved the nutrient welfare of the Basotho by providing fresh vegetables to combat chronic malnutrition and diseases like phalegra and leprosy (Mashinini, 2001). Furthermore these gardens promoted employment, income generation and the empowerment of women and landless households. A success story behind two community gardens in Western Cape Province, (New Beginning Shelter and Kibbutz El-Shammah) showed that besides providing shelter for the homeless, community gardens produced enough food to sell and surpluses covered running costs for the next vegetable season (Anon 2006a). In Gambia, women took loans to build new community vegetable gardens to generate incomes; the majority used these incomes to pay for school fees and teaching materials for their children (United Nations (UN), 2006). Community garden participants in Senegal formed Rural Enterprise Promotion (REP) projects, that added value to agricultural

produce that allowing parents to invest their added income in the education of their children (UN, 2006).

Parry et al (2005) cautioned that due to the collective and collaborative nature of community gardening, these could also be a context in which social divisions are created and sustained or exclusion fostered, thus homogeneity among members is encouraged. Community gardens are time consuming to organise and manage and their sustainability is often reliant on one or two individuals having the capacity to coordinate the activities of other members (Parry et al, 2005). A lack of sustainable management due to conflicts like age, gender, economical and political powers resulted in decreased productivity of community gardens in Lesotho (Mashinini, 2001).

2.3.2 Impact of home gardens on household food security

A home garden may be regarded as a ± 150m^2 piece of land at a resident's home used for production of vegetables, fruits, chickens and small animals such as rabbits, mainly for personal consumption, but the surplus can be sold (Nell et al, 2000). FAO (2004) observed that home gardens have the following advantages:

- The location of garden close to home reduces the risk of losses from foraging wild animals and theft.
- Species diversity and staggered planting increase the likelihood of crop survival by taking advantage of inhibition of pests and disease build-up, as could be the case in a mono cropping system and spreads the risk of crop failure in the case of adverse weather conditions.
- Home garden operations can readily be integrated into daily household chores, helping women to earn an income while undertaking household chores.
- Home gardens can provide environmentally sound opportunities for waste disposal including kitchen waste, paper and other materials because of close proximity to homes.

Faber et al (2002) showed that home gardens have the potential to increase direct access to pro-vitamin A- rich foods for economically deprived households through the

growing of yellow and dark green leafy vegetables. A study involving 83 households in Ndunakazi, a rural village of low socio-economic status in KwaZulu-Natal showed that 33% of respondents indicated that they no longer bought vegetables, 21% associated home gardening programmes with poverty alleviation, while 8% were able to sell some of their home garden produce for cash (Faber & Benade, 2002). In Bangladesh, strengthening home garden production systems for planned year round production increased the availability, consumption, and sale of vegetables and fruit for poor rural households, resulting in improved nutritional status (Khan & Begum, 2006).

Home gardens in San Jose, Costa rica were found to improve quality of life by beautifying neighbourhoods; stimulating social interaction; producing nutritious fresh vegetables and fruit; encouraging self reliance; conserving resources; and creating opportunities for recreation and education (Nell et al, 2000). In Nepal and Chile, fast-growing vegetables, beans and other plants are cropped intensively in home gardens with successive planting occurring almost immediately ensuring availability of food for most of the year (FAO, 2004). By consuming vegetables and fruit from home gardens, money spared from non-purchases was available for other uses in the household, like paying for school fees (Nell et al, 2000).

Aliber & Modiselle (2002) confirmed the benefits of home gardens by showing that in 2002, KwaZulu-Natal rural households with food gardens experienced improved dietary diversity through growing a variety of crops in their home gardens. However, a study conducted in Lesotho on five villages in five districts on 538 children showed that some 49% of children in households with household gardens were stunted, 29% were underweight and 24% showed wasting, indicating that household gardens may not have provided sufficient food to impact positively on the nutritional status of the sampled children (Makhotla & Hendriks, 2004).

2.4 Food security interventions focusing on food production

Increasing domestic agricultural production in rural areas may be a valid strategy to reduce food insecurity, but requires government to allocate public resources towards

improving agriculture in rural households (HSRC, 2004). Food production interventions implemented by development agencies are development-oriented and could lift people out of poverty by providing physical, human, and social capital to sustain households even after assistance ceases (Haddad & Zeller, 1996). One of the disadvantages of having crop production as the main food insecurity intervention is that crop production is susceptible to natural disasters, like droughts, pests and diseases (FAO, 1995). However, the advantages of crop production interventions far outweigh their disadvantages. Devereux (2003) cautioned that for the longer term, a food security strategy is needed that includes supporting farmers while simultaneously strengthening the non-agricultural economy, so that livelihoods become more diversified (for risk-spreading reasons) and less dependent on rain-fed agriculture. The next section looks at examples of programmes that address food insecurity, focussing on food production.

2.4.1 Introduction of high yielding varieties

High yielding varieties refer to crops that have been specially bred or selected to produce more than the native varieties of the same species (FAO, 2002b). High yielding varieties could address food insecurity by directly increasing the amount of food available for consumption. Surplus produce may be sold and households could have access to other foods through purchases, hence making access to diverse diet possible. Currently, in southern Africa, approximately one third of maize can be classified as high yielding varieties with yields of up to 40% more than the local varieties under the same growing conditions (FAO, 2002b). For example, widespread adoption of maize hybrid varieties in Zimbabwe by small-holder farmers doubled maize yields over the period 1979-85 resulting in surplus maize being sold (Bourdillon et al, 2003).

Nigerian farmers adopting high yielding cowpea varieties recorded yields of up to 1200kg/ha compared to the local variety yield of 500kg/ha that enabled farmers to have food for consumption and selling (International Institute of Tropical Agriculture (IITA), 2004). High yielding rice varieties, yielding 30% more than conventional varieties helped China to increase rice production by nearly 200 million tons from 1976-1991 resulting in reduced rice prices and availability to poor households (FAO,

2002b). Studies conducted in India confirmed that widespread use of high yielding rice varieties since the 1960s reduced food prices for the poor and prevented millions of cases of childhood malnutrition (Future Harvest, 2000). Without the development of high yielding varieties, food prices in developing countries could be as much as 40% higher than they are today. High yielding varieties have reduced costly food imports by almost 8% eliminating the need to convert millions of hectares of forestland to agricultural uses (Future Harvest, 2000).

Some of the disadvantages of high yielding varieties include costly management (30-35%) and unsuitability for use as seed (IITA, 2004). Most high yielding varieties are suitable in high potential agricultural areas and may be of less importance to households living in agriculturally marginal areas (Bourdillon et al, 2003)

2.4.2 Soil fertility enhancement

Soil fertility may be considered as the soil quality providing essential chemical elements in quantities and proportions for the growth of specified plants and can be enhanced by fertiliser use (Brady & Weil, 1999). Fertiliser is any of a large number of natural and synthetic materials, including manure and nitrogen, phosphorus, and potassium compounds, spread on or worked into soil to increase its capacity to support plant growth and may be classified into two categories, organic or inorganic (The Fertiliser Institute, 2007). Organic fertilisers are derived from living or once living material, including animal waste, crop residue, compost and numerous other by-products of living organisms; while inorganic fertilisers are derived from non-living sources and include most of our synthetic, commercial fertilisers (Sharma & Subehia, 2003). Mugwira et al (2002), working at Matiza in Zimbabwe showed that application of manure on a maize crop using locally cultivated maize variety resulted in a mean yield increment of 59%, while the fertiliser treatments enhanced the yield by 50%. Households that adopted fertiliser use realised bumper harvests enough for consumption and incomes from the surplus that elevated their food security levels (Sharma& Subehia, 2003). The advantages of using inorganic fertilisers are that: nutrients are immediately available to plants; exact amounts of a given element can be measured before feeding plants; fertiliser applications can be applied just when needed by the crop; and commercial fertilisers are required in small volumes

compared to organic fertilisers (Ahlawati et al, 2006). Some of the disadvantages of using commercial fertilisers include: leaching out of the soils, particularly nitrogen, is easily leached out by rain or irrigation water; prolonged use of commercial fertilisers destroy soil structure eventually leading to reduced yields; soils become acidic with time requiring a costly process of liming to reduce the soil acidity (Sharma & Subehia, 2003). In a field experiment on acidic soil in the western Himalayas, India, continuous cropping for 25 years with nitrogen fertiliser alone aggravated the problem of soil acidity by lowering the pH from 5.8 to 4.7 reducing grain yields of maize (*zea mays*) and wheat (t*riticum aestivum*) (Ahlawati et al, 2006).

2.4.3 Bio-fortification of staple crops

Bio-fortification is the process of breeding food crops rich in bio-available micro-nutrients, where crops are bred to load themselves with high levels of minerals and vitamins in their tissues, that are harvested and eaten (Harvest Plus, 2003). Bio-fortification could compliment existing nutritional approaches by offering sustainable and low cost ways to reach people with poor access to formal markets or health care systems especially when stable crops like rice, wheat, maize, cassava and beans are bio-fortified (IFPRI, 2002). *Golden Rice* is a good example of a bio-fortified crop, where bio-fortification was achieved by genetic modification of the rice plant to produce and accumulate pro-vitamin A in the grain, a trait not found in nature. Another example is *orange-fleshed* sweet potato varieties that are naturally rich in ß-carotene are an excellent food source of pro-vitamin A.

2.5 National food security programmes implemented in South Africa

In 2004, 47% of the South African population suffered from food poverty, they were not earning enough money to be able to afford a basic meal (Kallman, 2004). The government has implemented a wide range of programmes and measures to help people access food as well as other measures to enforce the right to food (Table 2.3).

Table 2.3: Food security programmes implemented by government departments in South Africa to address food insecurity (Kallman, 2004:8-13)

Implementing National Departments	Food security programmes to address food insecurity	What does the program do?
Agriculture	Agricultural Starter Pack Program	Recipients of food parcels are given a "starter pack" of seed and gardening equipment to do some agricultural activities.
	Comprehensive Farmer Support Package	Aimed at ensuring the restructuring of the agricultural sector to promote equity, competitiveness, sustainability and growth
	Land Care Programme	Provides funds for community-based projects such as building of dams and community gardens that can increase food security and create jobs
Education	National School Nutrition Program	Provides funding to primary schools for school feeding programmes
Health	Integrated Nutrition Program	Provide nutrition interventions at hospitals and clinics to prevent child malnutrition, provide vitamin A supplements to mothers of new-born babies and provide nutritional supplements to people living with HIV/AIDS
	Food Security Projects	Provides support through clinics, for establishment of food gardens, encouraging beneficiaries toproduce food for themselves
Social Development	Social Assistance Programmes	Provide grants for people who are unable to provide food for themselves, improving their access to food
	Poverty Relief Program	Funding of poverty alleviation programmes such as supporting income-generating activities for rural women and funding skills development projects to increase employment opportunities
	Emergency Food Relief Programmes	Provides poor families with food parcels
Science and Technology	Agro-processing Technologies Project	Transfer appropriate technologies and build indigenous knowledge for food security by creating sustainable jobs
Land Affairs	Land Redistribution for Agricultural Development	Provides grants to previously disadvantaged South African citizens to access land for agricultural purposes

Misselhorn (2006) observed that government food security programmes would succeed if the following could be considered: linkage between short term and long term food insecurity interventions; community participation in the development and implementation of food security programmes; developing people skills, capacities and knowledge; addressing community needs holistically and building key relationships with beneficiaries. The impacts of government initiated food security programmes have not previously been evaluated.

2.6 Impacts of agricultural production programme on food security

Agricultural production impacts on food security may be viewed as any changes in food security resulting from agricultural production interventions that may be long term or short term (Wainwright, 2003). Agricultural production impacts may be

described as a set of beneficiary and population level results including: improved food security; improved yields; and improved nutrition achieved by changing practices, knowledge and attitudes (Bergeron et al, 2006). Riely et al (1999) showed (Figure 2.2) that a gross outcome of an intervention may be as a result of the impact interventions (net outcome) in addition to other outcomes not related to the intervention. Agricultural production program impacts may refer to a set of program results occurring at a beneficiary level which may be directly attributable to program activities rather than from external factors that may influence beneficiary lives (Riely et al, 1999). Hoddinott & Yohanness (2004) stated that agricultural production interventions contributed to food security by increasing availability of food at prices households could afford; and provided job opportunities and incomes that resulted in increased access to food leading to improved nutrition.

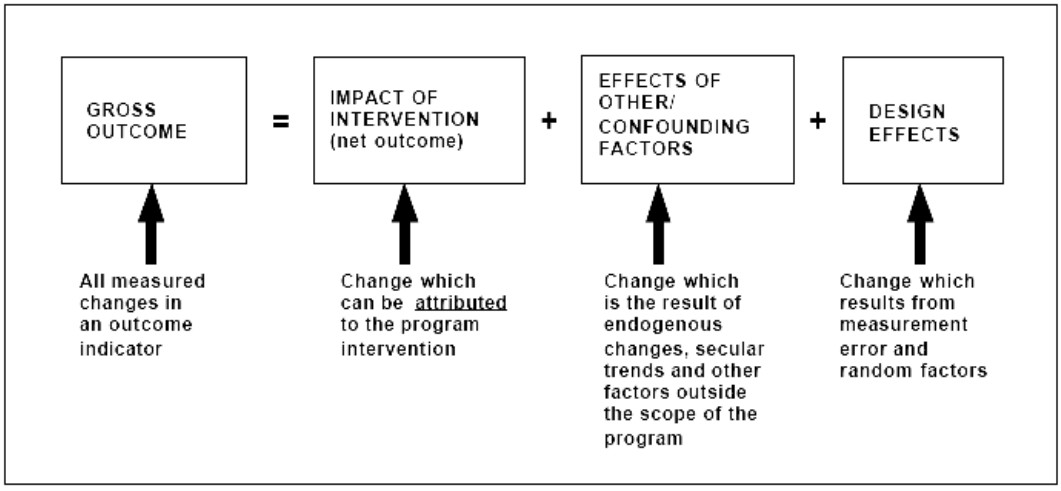


Figure 2.2: Impact of intervention focus (Riely et al, 1999:32).

Accurate measurement and monitoring of food insecurity can help public officials, policy makers, service providers and the public to assess the changing needs and effectiveness of existing programmes (Bickel et al, 2001). A commitment to food security carries with it an important implication, namely the need to measure food security outcomes at beneficiary levels, which includes identifying the food insecure, the food security shortfalls, and the nature of food insecurity (Hoddinott, 2002). Impact measurement depends on the objective of measurement; how the information is to be used and by whom; the level of reliability required and the resources (money,

human and time) available (Enterprise Development Impact Assessment Information Service (EDIAIS), 2006). Due to a greater variety of agricultural production activities implemented by governmental and non-governmental organisations to address food insecurity, development of a standard set of indicators to measure agricultural production impacts has been problematic (Swindale & Bilinsky, 2006). An indication of why agricultural impacts on food security should be measured and possible methods of measuring these impacts is discussed below.

2.6.1 Why should agricultural production impacts on food security be measured?

Agricultural production impact measurements are designed to gauge the extent to which an agricultural production intervention program induces changes in food security conditions, such as improvement in nutritional status at beneficiary level (Riely et al, 1999). The European Evaluation Agency (EEA) (2001) noted that the general objective of an evaluation is to learn from experience, obtain recommendations at both institutional and operational levels and to inform future decisions about a program. Title II programmes under American Public Law (PL) 480 has the primary goal of promoting food access in foreign countries, on behalf of the people of the United States to address famine or other urgent or extraordinary relief requirements (United States Agency for International Development (USAID) 2006). All Title II programmes focus on food security improvements as their core objective with special attention to the access and utilisation components of food security. Consequently, the need to measure changes in the level of food security in any Title II intervention programmes is important (Swindale & Bilinsky, 2005). Impact measurements are critical to guide the management of current activities, inform resource allocation decisions across program components and support the design or redesign of future interventions to maximise potential impacts (Riely et al, 1999). The choice of the most appropriate agricultural production intervention can only be made after a good understanding of food insecurity in the target population and the practicability of implementing such an intervention (Beerlandt & Huysman, 1999). Devising an appropriate measure of household food access is useful in order to: identify the food insecure; characterise the nature of their food insecurity (seasonal

versus chronic); monitor changes in their circumstances; and assess the impact of agricultural interventions (Hoddinott & Yohanness, 2004).

2.6.2 Measuring the impact of agricultural production interventions on food security

The impact of agricultural production interventions on food security is determined by the methodologies used, which may be in the form of a sample survey; rapid appraisals; participatory observations; case studies or participatory learning and action (EDIAIS 2006). There have been conceptual developments in the measurement of food security which include a shift from using measures of food availability and utilisation to measuring "inadequate access" (Webb et al, 2006). A further development entails a shift from a focus on objective to subjective measures; and a growing emphasis on fundamental measurement as opposed to reliance on distal, proxy measures (Webb et al, 2006). Food security is a broad complex concept, determined by the interaction of a range of agro-physical, socioeconomic and biological factors (Riely et al, 1999). There is no single, direct measure of food security and its measurement focuses mainly on three distinct interrelated dimensions, namely food availability, food access and food utilisation (Riely et al, 1999).

Depending on the proposed project, indicators may be categorised into process indicators, describing food supply and food access; and outcome indicators, describing food consumption (Hoddinott, 1999). Hoddinott (1999) recognised four ways of measuring household food security impacts:

- Individual intake, measure of the amount of calories or nutrients consumed by an individual in a given period, usually 24 hours.
- Household energy intake, the number of kilojoules or nutrients available for consumption by household members over a defined period of time.
- Dietary diversity, the sum of the number of different foods consumed by an individual over a specified time.
- Index of household behaviours, an index based on how households adopt to the presence of or threat of food shortages.

A comparison of these methods in terms of cost, time, skill requirement, and susceptibility to misreporting is shown in Table 2.4

Table 2.4: Comparison of methods of measuring household food security (Hoddinott, 1999:16)

	Individual intake	**Household caloric acquisition**	**Dietary diversity**	**Index of household behaviours**
Data collection costs	High	Moderate	Low	Low
Time required for analysis	High	Moderate	Low	Low
Skill level required	High	Moderately high	Moderate low	Low
Susceptibility to misreporting	Low	Moderate	Low	High

There is a strong demand among Title II programmes supported by Private Voluntary Organizations (PVO) and other agencies for a relatively simple, methodically rigorous measure of food security, particularly the access dimension that can be used to guide, monitor and evaluate operational interventions (Swindale & Ohri-Vichaspati, 2005). In response to this demand, the Food and Nutrition Technical Assistance (FANTA) project undertook a set of activities to identify a scientifically validated, simple, and user-friendly approach to measure the impacts of food security interventions (FANTA, 2005). Food insecurity has four components, two related directly to food quantity, quality and two that are psychological and social, ‘certainty’, related to worry about food, and ‘acceptability’, related to how food is acquired (Wolfe & Frongillo, 2001). The four food insecurity components are captured in the United States National Food Security Measure, an example of a conceptually well grounded measure based on experience of food insecurity and used as a precursor to HFIAS development (FANTA, 2005). FANTA (2005) reported the development of the Household Food Insecurity Access Scale (HFIAS) tool for measuring household food insecurity.

2.7 Household Food Insecurity Access Scale (HFIAS)

Organizations measure household food insecurity for program design, planning, targeting, implementation, monitoring, and evaluation, but existing measures often are inadequate (Frongillo & Nanama, 2004). Existing measures lack the ability to differentiate households at varying degrees of food insecurity in order to target and evaluate their interventions (Webb et al, 2006).

Studies were conducted in Burkina Faso and Bangladesh with the objective of developing a Household Food Insecurity Access Scale (HFIAS) based on locally recognised experiences (Coates et al, 2006). FANTA (2004) reported that studies identified the following themes representing a universal list characterising the experience of food insecurity across countries and cultures:

- Fear/ anxiety/worry about running out of food (depletion),
- Insufficient food intake (quantity),
- Quality of food, and
- Household behaviours to increase household resources.

HFIAS was developed based on the idea that the experience of food insecurity (access) causes predictable reactions and responses that can be captured and quantified through a survey and summarised on a scale (Coates et al, 2006). Recent exploration for measures of access failure has focused increasingly on household behaviours known to reflect, not only increased severity in food stresses, but also the actual experience of hunger (Webb et al, 2006).

HFIAS measures the access component of household food insecurity based on an in-depth understanding of household food insecurity at household level (Coates et al, 2006). Development of HFIAS was based on the underlying concept that food insecurity (access) is a measurable experience that can be described and analysed to categorise households on levels of food insecurity (access) (Coates et al, 2006). HFIAS can be used to assess prevalence of household food insecurity (access) and to detect changes in the household food insecurity (access) situation over time and

categorise household food insecurity (access) into different levels of severity (Coates et al, 2006).

The HFIAS is the most recently developed tool for measuring household food insecurity consists of a set of nine generic questions (Q1 – Q9) (Table 2.5) (Coates et al, 2006).

Table 2.5: Household Food Insecurity Access Scale (HFIAS) generic questions (Coates et al, 2006:5)

	Occurrence Question
	For each of the following questions, consider what has happened in the past 30 days. Please answer whether this happened, never = 0, rarely (once or twice) = 1, sometimes (3-10 times) = 2, or often (more than 10 times) = 3 in the past 30 days?
Q1	Did you worry that your household would not have enough food?
Q2	Were you or any household member not able to eat the kinds of food you preferred because of lack of resources?
Q3	Did you or any household member eat just a few kinds of food day after day due to lack of resources?
Q4	Did you or any household member eat food that you preferred not to eat because of lack of resources to obtain other types of food?
Q5	Did you or any household member eat a smaller meal than you felt you needed because there was not enough food?
Q6	Did you or any household member eat fewer meals in a day because there was not enough food?
Q7	Was there ever no food at all in your household because there were not enough resources to get more?
Q8	Did you or any household member go to sleep at night hungry because there was not enough food?
Q9	Did you or any household member go a whole day without eating anything because there was not enough food?

The HFIAS questions are structured to address three food insecurity conditions. Q 1 addresses anxiety and uncertainty of household food supply, Q2 – Q4 addresses food quality (variety and preference) and Q5 –Q9 addresses insufficient food intake and its physical consequences. Q2 – Q4 and Q5 – Q9 are organized in order of increasing severity of the food insecurity condition (Coates et al, 2006).

Data from responses to the nine HFIAS questions, adapted to the community under survey are analysed to give household food insecurity on the following indicators:

- The percentage of households that responded affirmatively to each question regardless of the frequency of the experience;
- The prevalence of households experiencing one or more behaviours in each of the three food insecurity conditions; anxiety and uncertainty, insufficient quality and quantity of food intake;
- The degree of food insecurity in the household calculated by summing the coded frequency of experience for each question;
- The prevalence of household food insecurity categorising households into four levels of food insecurity: food secure; mildly food insecure; moderately food insecure; and severely food insecure, based on the idea that households are categorised as increasingly food insecure as they respond affirmatively to more severe conditions and/or experience those conditions more frequently.

2.7.1 Validation studies of HFIAS

Over time, FANTA has undertaken a set of activities aimed at validating the United States Household Food Security Survey Measure (US HFSSM) approach for use in developing countries and testing the usefulness of the resulting scales as impact indicators for the access component of household security in program evaluations (Coates et al, 2006). A two multi-year field validation study was undertaken using the United States Household Food Security Survey Measure approach to develop and validate experiential household food insecurity scales. The aim of the studies was to arrive at a consensus on the feasibility of developing a universally applicable HFIAS and to define the domains and questions that would form part of a standardised questionnaire. Field validation studies were conducted by Cornell University in Burkina Faso with Africare, Tufts University in Bangladesh with World Vision, and Freedom from Hunger in Burkina Faso, Bolivia, Ghana, and the Philippines (Coates et al, 2006).

Studies carried out in Burkina Faso provided strong evidence that the experience-based food insecurity score, calculated from items administered by a questionnaire, is valid for determining seasonal differences in the availability and access components of household food insecurity; differences among households in food insecurity at a

given time; and changes in household food insecurity over time in production units with children under five years of age in northern rural Burkina Faso (Frongillo & Nanama, 2004). Other research carried out in Bangladesh has validated the household questionnaire approach as a viable and extremely useful tool for operational use in food security-related programming and evaluation. In the context of rural Bangladesh, nine questions on behavioural responses to food stress successfully characterised the problem of food insecurity, and succeeded in ranking households along a continuum of experiences from immediate hunger to sustained food security (Coates et al, 2003).

2.7.2 Programmes using HFIAS tool

HFIAS tool has been identified as useful in baseline surveys as an early warning for the purpose of assessing trends in food consumption related to food access; in measuring impact of policies and interventions; and for innovative uses such as community self-monitoring related food security projects and the right to food awareness (FANTA, 2007). Development agencies are increasingly adopting the use of HFIAS tool in their projects.

The HFIAS tool has been implemented in Burkina Faso, Kenya, Malawi, Mozambique, Somalia and West Bank/Gaza Strip by the EC-FAO, Food Security Information for Action Programme in collaboration with FANTA (Dop et al, 2006). The tool is being used in these countries in order to build capacities of national institutions to produce relevant food security and nutrition information for timely decision-making (Dop et al 2006). The National Department of Agriculture – South Africa: Food security directorate (2006) used the HFIAS tool to evaluate food security in Sekhukhune.

CHAPTER 3

DESCRIPTION OF THE STUDY AREA

3.1 The geography and population dynamics of the study area

This study was conducted in the Maphephetheni uplands (Figure 3.1). The Maphephetheni Uplands is a rural area of KwaZulu-Natal, South Africa situated approximately 80 kilometres west of Durban in the Valley of a Thousand Hills. The area is adjacent to the expansive Inanda dam. The Umgeni River forms the southern boundary, the Mqeku River the western boundary and the eastern and northern boundaries are plateaus. The area falls in the Ndwedwe magisterial district and is divided into two sections, the uplands and lowlands. The Maphephetheni Uplands has an altitude that rises from less than 200 meters on the edge of Inanda dam to over 600 metres on the plateau above sea level (Green & Erskine, 1999). The Maphephetheni Uplands area is presided over by a traditional leader, chief Gwala and a community representative council.

Overall population of the Maphephetheni Uplands was estimated at 16 000 people constituting 2000 homesteads, implying an average of 8 persons per household (Green et al, 2001). On average, each homestead had four dwellings, typically housing extended family members (Rural Area Power Solutions Consulting (Pty) Ltd, 2004). In 1999, the average household income was estimated to be R348 per capita per month (Green & Erskine, 1999) showing that households in the Maphephetheni Uplands were poor, falling below the South African poverty line of R352 per month per adult equivalent (May, 1998). Income generating activities in the area included non-farm activities (selling of snacks, food, cold drinks, beer, clothes, bead works and shoe repairs) and farm activities (crop production and sales of peanut, vegetables, chicken, eggs and goats) (Green et al, 2001).

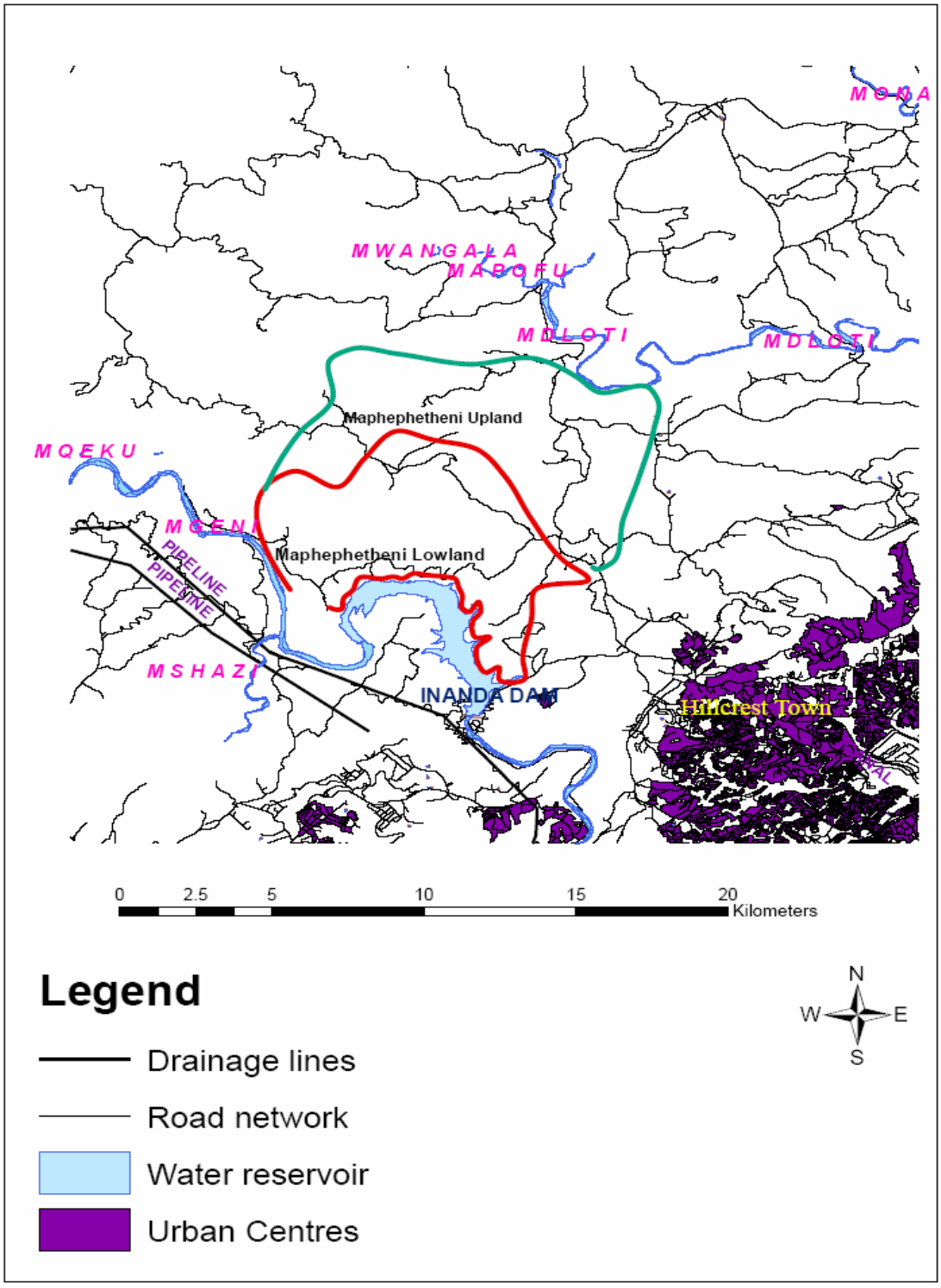


Figure 3.1: **Map showing location of the Maphephetheni Uplands (Anon, 2006)**

3.2 Description of community gardens in the Maphephetheni uplands

Founding community gardens (Four) in the Maphephetheni uplands were formed in 1992 in response to a period of hunger and malnutrition in the area (Mungai 2006). Besides gardening, women in the community gardens were involved in other activities like crafting, beadwork, sewing, candle making and chicken rearing. According to the findings of Chingondole (2006), the community garden members see community gardens as contributing to food security as community gardens provide them with healthy foods to feed their children/household members in addition to being a source of social support and subsistence income. Community garden club members reported that community gardens provided them not just with food and subsistence income, but also with a sense of belonging together, connectedness, networking, sharing and social support, particularly in times of shocks and stresses such as illness, death and food insecurity (Mungai 2006). All community garden club members reported undertaking one or most or all of the following community garden tasks: ploughing, planting, watering the garden, weeding, harvesting, processing of basic food stuff, tending animals and selling some of the community garden produce. Chingondole (2006) observed that community garden club members saw the future of community gardens as shaky and not very much promising for the following reasons: Lack of pest control knowledge; lack of water pipes/irrigation systems (water problem); lack of adequate fencing to protect their gardens/crops from animals such as cattle and goats; lack of market to sell their produce for income; an agricultural extension officer does not visit them (but are aware of the existence of the extension officer that is supposed to be visiting them). If these are not addressed, then the members do not see the future of community gardens as promising.

CHAPTER 4

METHODOLOGY

4.1 Survey design

This study was conducted with community garden groups in the Maphephetheni Uplands of KwaZulu-Natal. During the presentation of the results of a previous study by another researcher in the area, the researcher of this study was introduced to the community. During this meeting, the intention to conduct a study with the same community gardeners on "the contribution of community gardens to food security in the Maphephetheni Uplands" was proposed. The chief and the participants in the community garden groups accepted and approved the proposal for the current research project.

Between May and June 2006, a survey of 53 households participating in community gardens in the Maphephetheni Uplands was conducted to determine household food security using the HFIAS. A total of seven group meetings with community garden participants were organised. Individual household representatives were asked to respond to a food security measurement questionnaire (Appendix B) and also participate in focus group discussions. A face to face survey technique was employed and pre-prepared prompts and probes were used to ensure adequate understanding of the questions by participants. A face to face survey was preferred because of the low level of literacy in the area (Green et al, 2001) to ensure adequate completion of the questionnaires (Babbie and Mouton 2001:262). Qualitative data was collected through the use of focus groups.

Kelly (1999) suggested that some of the reasons why focus groups are important as a data collection tool are to:

- Supplement the questionnaire as a source of data;
- Know what people really think and feel;
- Create a process of sharing and comparing information among participants; and

- Provide an environment that is stimulating and secure for members to express ideas without fear of criticism.

The questions for the focus group discussions are presented in table 4.1.

Table 4.1: Focus group discussion questions with seven groups of community gardeners. Maphephetheni Uplands, 2006

1.	What are some of the issues that cause anxiety and uncertainty about household food supply?
2.	What are some of the factors that affect your consumption of a variety of the types of food you prefer?
3.	What are some of the issues that affect your consumption of sufficient quantities of food?

The synergy in a group has the potential to uncover important constructs and focus groups create a fuller, deeper understanding of participant's perceptions and feelings (Greeff, 2002:319). Focus groups enable access to inter-subjective experiences shared in a community (Saunders & Buckingham 2004:134). A disadvantage of focus group discussions is that the findings cannot automatically be projected onto the population at large (Greeff, 2002:319).

Quantitative data collection was carried out through a questionnaire. Each individual in a group completed a questionnaire without discussion. Group-administered questionnaires save time and cost since group members are handled simultaneously and exposed to the same stimulus (Delport, 2002:174). However, even though each respondent completes their own questionnaire, some degree of mutual influence may occur, for example, if one fails to ask questions for fear of embarrassment, this can lead to arbitrary answers, which may affect the validity of data (Delport, 2002:174).

4.2 Selection of survey participants

Participants in the study were drawn from a population of community gardeners in the Maphephetheni Uplands. All community gardeners were invited to survey meetings that were held at each community garden. All those present were requested to participate in the survey. In total, 53 out of 121 community gardeners were interviewed. The sample size (44%) is within the guidelines for a representation of the population (Strydom & Venter, 2002:201).

4.3 Survey materials and approaches

As indicated above, a questionnaire and focus groups were used as the data collection instruments (Appendix B). The questionnaire was divided into three sections. Section one required the participant to respond to questions asked about household demographics; section two asked questions concerning household participation in community gardens; and section three included the nine HFIAS questions.

The questionnaire was written in English and Zulu, the local language in the Maphephetheni Uplands to allow the participants a language choice. In order to adopt phrases, definitions and examples to the local context and to ensure that questions were understood appropriately, the questionnaire was initially reviewed with a group of key informants (Coates et al, 2006). The key informants included an assistant to the chief and two head men selected because they live in, understand, and are members of the Maphephetheni Uplands community prior to the survey. The key informants live among the community and are familiar with the conditions and experiences of household food insecurity in the area. During the questionnaire review, the key informants were asked as a group to respond to the HFIAS questions (Appendix B part 3), guided by a key informant interview guide (Coates et al, 2006). Information collected was then used to adapt the HFIAS questions into a draft questionnaire, while retaining the original meaning of the questions but making the meaning clearer for respondents.

Further questionnaire refining was done by five Maphephetheni Uplands community garden participants. Each individual was guided through the questionnaire and notes were taken on their understanding of the questions. Questions were adjusted while retaining the original meaning of the question (Coates et al, 2006). After the two meetings, the questionnaire was adjusted and translated into Zulu and copies made. A coordinator from the community helped in scheduling meetings. In total, seven meetings were held to cover the seven functional community gardens under discussion.

During the meetings for data collection, participants were informed by the researcher through a translator that participation in the study was voluntary. The researcher guided the respondents through the questionnaire (Appendix B) and explained what was expected of respondents. With the help of two assistants, questionnaires were completed. Before handing in the completed questionnaire, the researcher and research assistants ensured that the questionnaires had been fully completed. The respondents were thanked for their participation and assured that their questionnaire responses would remain confidential. The respondents were promised that after the completion of data analysis, the researcher would request them to attend a meeting for the presentation of survey results. A copy of the survey results would be left with the Chief of Maphephetheni.

4.4 Data analysis and presentation of results

Data from the Maphephetheni Uplands food consumption survey (Chingondole, 2006) from households participating in community gardens supplemented the data collected from this study. Data analysis was sequenced to address the sub problems of the study. Demographic data from the questionnaire (Appendix B parts 1 and 2) was coded (Appendix C) and entered into the Statistical Package for Social Sciences (SPSS) program (version 13) and descriptive statistics done. This data gave the general characteristics of the respondent households. The results were then used to explain findings of other areas of the study where applicable. Other analyses carried out included: Pearson's correlation coefficients cross tabulations and one way analysis of variance to show relationships between variables.

Responses to Q1 of the HFIAS were analysed and the percentages of people who affirmatively responded to the question were calculated to give the percentage of households experiencing anxiety and uncertainty at any level of severity (Coates et al, 2006:16). The degree of severity of the response was also calculated by considering the number of those who responded, ‘rarely’ or ‘sometimes’ or ‘often’ to question one. Themes (Appendix D) from group discussions concerning question one (Table 4.1) of the group discussions were used to explain some of the results.

Responses to Q2, Q3, and Q4 of the HFIAS were analysed to give the percentage of respondents experiencing insufficient food quality, including variety and preferences of food types (Coates et al, 2006). The degree of severity was calculated by considering the number of participants that responded, ‘rarely’ or ‘sometimes’ or ‘often’ to each of the three questions. Themes (Appendix D) from group discussions concerning question two (Table 4.1) of the group discussions were used to explain some of the results.

Responses to Q5, Q6, Q7, Q8 and Q9 of the HFIAS were analysed to give the percentage of households experiencing inadequate food intake (Coates et al, 2006). The degree of severity was calculated by considering the number of participants responding, ‘rarely’ or ‘sometimes’ or ‘often’ to each of the five questions. Themes (Appendix D) from group discussions concerning question three (Table 4.1) of the group discussions were used to explain some of the results.

Household Food Insecurity Access Scale score was calculated for each household by summing the coded frequency of experience for each question (Coates et al 2006:17) (Appendix E). The maximum score for the HFIAS was 27, the household response to all nine questions was “often” coded with a response code of 3; the minimum score was zero. The higher the score, the greater the food insecurity a household experienced. A household score was given by the sum of the frequency or experience during the past 30 days for the nine food insecurity related conditions (equation 4.1).

HFIAS Score (0-27) = Sum frequency code (Q1 + Q2 + Q3 + Q4 + Q5 + Q6 + Q7 + Q8 + Q9) ---------- **Equation 4.1**

Each individual household HFIAS score was entered into SPSS (version 13) as an additional variable. A correlation between HFIAS score and other variables was derived in addition to an Analysis of Variance.

4.4.1 HFIAS categories

Households were categorised into four categories depending on their responses to the nine HFIAS questions using the HFIAS framework (Figure 4.1) to give the Household Food Insecurity Access Prevalence (HFIAP) (Appendix E). Households were categorised as increasingly food insecure as they responded affirmatively to more severe conditions and/or experienced those conditions more frequently (Coates et al, 2006)

Question	Rarely	Sometimes	Often
	1	2	3
1			
2			
3			
4			
5			
6			
7			
8			
9			

Key:

Food secure

Moderately food secure

Mildly food secure

Severely food secure

Figure 4.1: Categories of Household food insecurity (access) (Coates et al, 2006: 19).

A mildly food insecure (access) household worried about not having enough food ‘sometimes’ or ‘often’, and /or ‘rarely’ ate a monotonous diet or less preferred food. The household did not cut back on quantity nor experience any of the three most severe conditions, going for a whole day without eating, going to bed hungry or running out of food (Coates et al, 2006).

A moderately food insecure household sacrificed quality more frequently by eating a monotonous diet or less preferred food ‘sometimes’ or ‘often’, and /or had started to cut back on quantity by reducing size of meals or number of meals ‘rarely’ or ‘sometimes’ (Coates et al, 2006).

A severely food insecure household had deteriorated to cutting back meal size or number of meals ‘often’, and/or experienced any of the three most severe conditions, going a whole day without eating, going to bed hungry or running out of food, even as frequently as ‘rarely’. Any household experiencing one of these three conditions, even once in the past 30 days was considered as severely food insecure (Coates et al, 2006).

4.4.2 Reporting study findings to the Maphephetheni Uplands community

The results of the study were reported to the community gardeners. All Maphephetheni community gardeners, Maphephetheni chief and the Maphephetheni council of elders were invited to a “research report back” meeting in one of the community gardens. A summary of the study findings were communicated to those in attendance by the researcher through a translator. Possible recommendations were discussed on how best community gardeners can address household food insecurity by involving other stakeholders.

CHAPTER 5

RESULTS AND DISCUSSION

This study set out to evaluate if households participating in community gardens in the Maphephetheni Uplands were food secure as determined by the HFIAS. The study assessed the responses of household representatives (n = 53) participating in community gardens to the nine generic questions of the HFIAS tool. More information about the level of food security among community garden participants was gathered through focus group discussions and analysis of household food consumption data. Food security levels were obtained through creating Household Food Insecurity Access Scale indicators. Descriptive data of key variables of surveyed households is shown in Table 5.1

Table 5.1: Descriptive data of surveyed households participating in community gardens, Maphephetheni uplands, 2006 (n = 53)

	Mean	Median	Range	Minimum	Maximum
Sex	2	2	1	1	2
Age	51	51	62	17	79
Schooling (Grade)	4	4	12	0	12
Number in household	7	7	9	2	11
Number of community garden members	18	25	19	7	26
Size of community garden (M^2)	3728	4500	3650	1600	5250
HFIAS score	16	17	23	4	27
Food insecurity category	4	4	2	2	4
Household income(Rand)	539	0	2820	0	2820
Household per capita income (Rand)	135	0	705	0	705

Community gardens in the Maphephetheni uplands were cultivated by women, most of whom were elderly and had low levels of education.Data collected from different variables was analysed to explore if these variables were related. Further correlations between household food insecurity levels and household characteristics, involvement in crop production and income generation activities were explored.

5.1 Demographics of community gardeners in the Maphephetheni Uplands

Household surveys were conducted among 53 community garden respondents. The respondents were drawn from seven of ten active community gardens in the Maphephetheni Uplands (Table 5.2). Household-owned plots in a community garden were cultivated by family members to produce food for household consumption and sale. At the time of this study, only seven community gardens were functional, the remainder were dormant and were not included in the study.

Table 5.2: Number of members and garden size in each community garden, Maphephetheni Uplands, 2006 (n = 7)

Name of community garden	**Total area of garden (m^2)**	**Number of households in each garden**	**Garden area per household (m^2/ household)**
Kanyezi	4500	26	173
Siyazama	4500	25	180
Thathani	3920	11	356
Sizathina	1600	11	145
Nkululekweni	1920	7	274
Siphamandla	4200	16	263
Siyajabula	4500	25	180
Average	**3591**	**17**	**21**
Total	**25140**	**121**	

Households generally had five different sources of food (Figure 5.1). Purchases were the main source of food and represented 83% of the total value of food consumed. Households used money earned from different sources to purchase food from local spaza shops or by commuters from Hillcrest and Durban. Community gardens were

the second most important source of food that contributed 11% of the total value of food consumed.

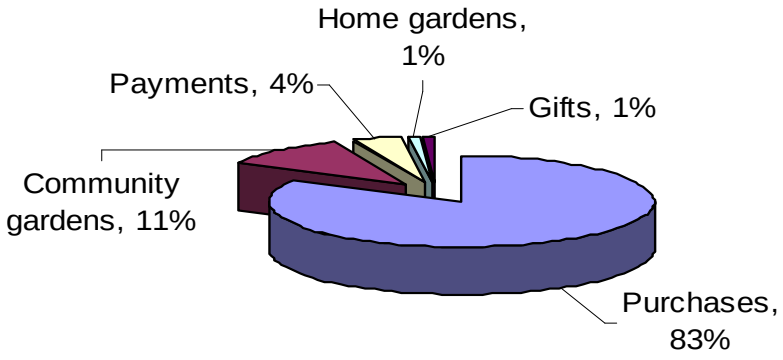


Figure 5.1: Sources of food among community gardeners, Maphephetheni Uplands, 2006 (n = 53).

The nature of the Maphephetheni Uplands terrain where homesteads are situated is very rugged (Appendix A, caption (a)). This terrain allows few households to produce food through cultivating home gardens. Home gardens contributed 1% to the total value of food consumed. In-kind payments (payment in terms of food instead of cash) to household members for services rendered to neighbours occurred during periods of food scarcity and constituted 4% of total value of food consumed. Household members with no alternative sources of food during periods of food scarcity received food gifts as charity from neighbours. This contributed 1% of the total value of food consumed.

Although purchasing was the main source of food among the surveyed households, 52% of households indicated that they did not earn any form of income. From the group discussions, households who received no income relied on community and home gardens for supply of food. Social networks among community gardeners were also important contributor to household food security. Households in the Maphephetheni Uplands had three main sources of income (Figure 5.2). Households received social grants from the government providing a stable source of income. Child

support grants of R190 a month (2006) were paid to primary care givers for children younger than 14 years and care givers who earned less than R1100 a month. A primary care giver was paid for each child up to a maximum of six children. Pensions were paid by the government to household members older than 60 years for females and 65 years for males. Senior citizens were paid R820 per month (2006) provided they met the cut off for a mean test. Other household support grants provided by the government include: disability; war veterans; foster child; and care dependency.

Some household members in the Maphephetheni Uplands were also involved in paid employment. Household members worked on local road-works projects, some worked for neighbours as manual labourers, and some worked on contract in the local water supply project. Incomes from wages and salaries from rural projects were unstable due to the seasonal nature of the projects.

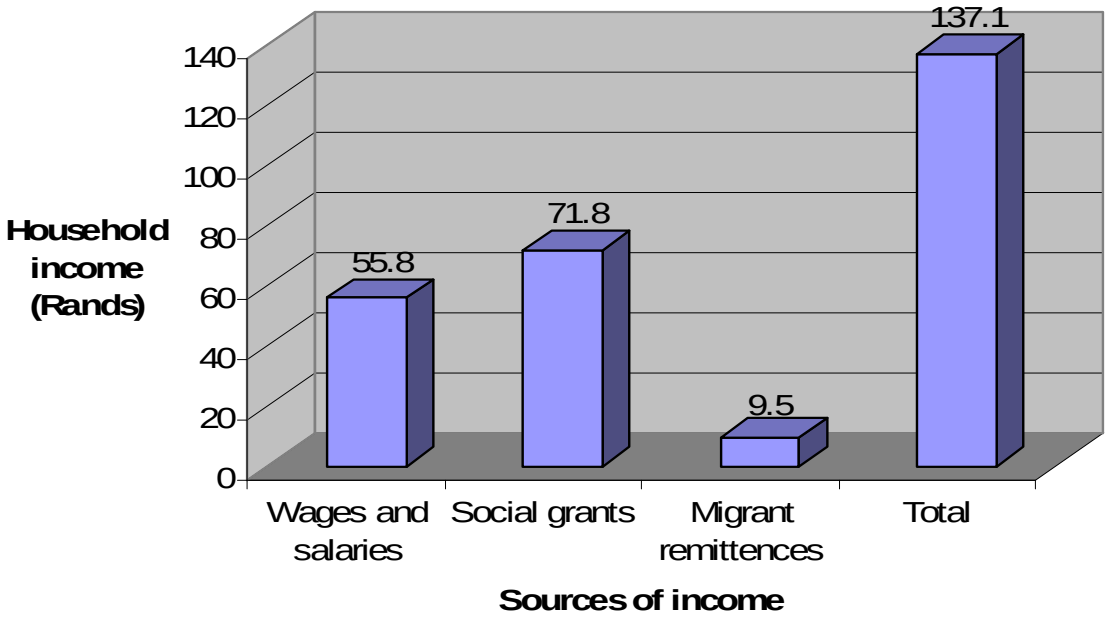


Figure 5.2: Per capita incomes among community gardeners, Maphephetheni Uplands, 2006 (n = 53).

Some household members employed in Hillcrest or Durban shared their income with households as migrant remittances. These household members were employed mainly

in the entrepreneurial informal sector as hawkers or operated spaza shops. Some were employed in the industrial sector.

Community gardeners in the Maphephetheheni Uplands were involved in a variety of occupations (Table 5.3). The two major categories of those involved in community gardens were full time gardeners (40% of respondents) and pensioners (34% of respondents). Other activities undertaken by community gardeners included housekeeping, self employment, job seeking, schooling, and vagrancy. The participants' levels of education varied from no education to twelve years of schooling. 36% of participants had not been to school. The average number of years of schooling was 4 years. The South African 1995 October household survey showed that 12.2 million adults (46%) had not received a full general education (schooling up to grade 9) and 2.9 million (11%) of adults had not been to school (Aitchson 2006) indicating that literacy levels were generally low.

Table 5.3: Community gardeners' involvement in other categories of occupation, Maphephetheni Uplands, 2006 (n = 53)

Occupation/ Main activity of community gardeners	**Community gardeners in each category (%)**
Wage employed	9
Community gardener	40
Self employed	4
Housekeeper	4
Pensioner	34
Job seeker	13
Scholar	6
Vagrant	2

Community garden participants owned productive assets including cows, sheep, goats, chicken, pigs and ox ploughs. They also owned non productive assets such as jewellery and televisions. The majority of community garden households owned chicken and goats (Figure 5.3).

Community gardeners were involved in activities related to their community gardens. Ninety three percent of participants indicated that they used commercial fertilisers on their gardens, while 94% indicated that they used manure. Forty three percent of respondents used water from streams next to their gardens to irrigate crops. Thirty six percent of the respondents indicated that they had never been visited by an agricultural extension officer, while 53% indicated that they were rarely visited by an extension officer. Hired labour was seldom used. Most participants (77%) used household labour in their gardens.

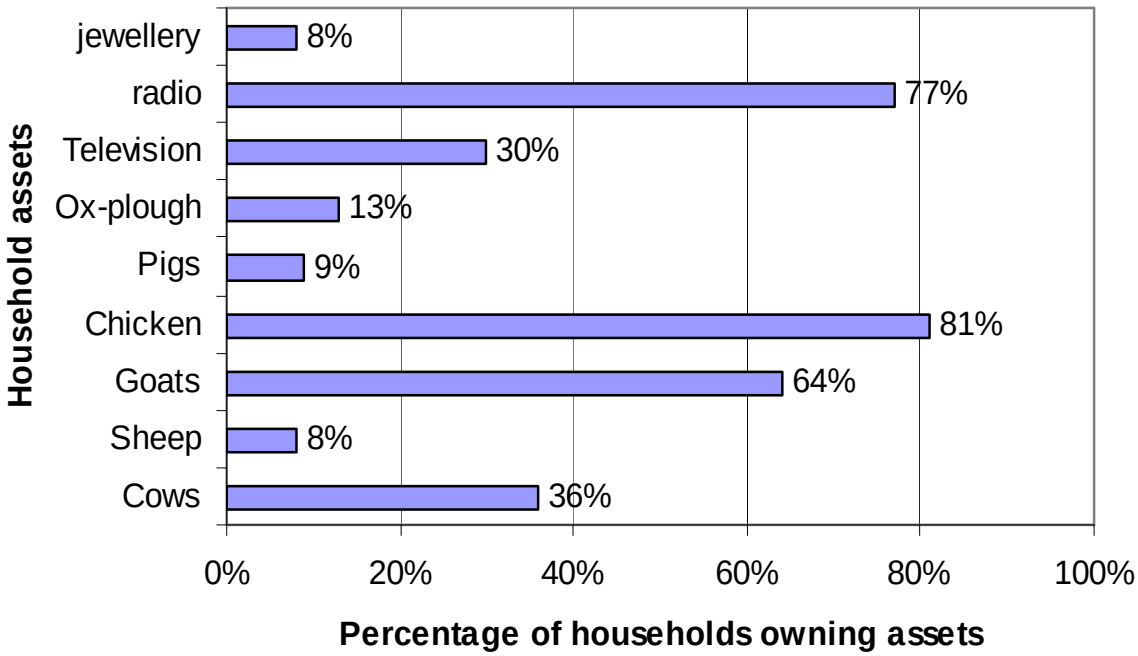


Figure 5.3: Households who owned assets among community gardeners, Maphephetheni Uplands, 2006 (n = 53).

The methodology for the investigation of the contribution of community gardens to food security in the Maphephetheni Uplands as determined by the Household Food Insecurity Access Scale is described in the next chapter.

5.2 Value of food from various sources

Households in the Maphephetheni Uplands obtained food from purchases, community gardens, in-kind payments, home gardens and gifts (Table 5.4). Most food, 83% of

total value of food consumed was obtained from purchases. This was an unexpected finding given that the Maphephetheni Uplands is rural and small-holder farming was expected to be the predominant source of food. FAO (2005a) had shown that the main source of food for rural households in developing countries was from small scale farming. Households used money obtained from various sources to purchase food from neighbouring spaza shops, neighbours and nearby cities.

Households cultivated plots in community gardens from which they obtained food for consumption (11% of total value of food consumed). Community gardens were small, on average 208m^2, located in valley bottoms and limited in size by cliffs on the upper and sideway boundary and river banks on the lower side not allowing for garden expansion (Appendix A, caption b). Community gardens were located in a marginal area confirming Wiebe et al's (2001) observation that the imbalanced distribution of land by the apartheid system resulted in black African communities occupying marginal land. Consequently, the quantity of food from community gardens was limited. In cases where community gardens lacked an irrigation source, crop losses from droughts were experienced leading to further reduction of household food. During periods of heavy rainfall, community gardens suffered crop losses because water from the hills collected in the valleys causing run off that washed away crops and reduced food production.

Table 5.4: Value of food from various sources among community gardeners, Maphephetheni Uplands, 2006 (n = 53)

	Sources of household food					
	Purchases	Community garden	In-kind payments	Home gardens	Gifts/ charity	Total
Monthly total value of food per capita (R)	126	17	6	3	3	155
Proportion of food from each source (%)	83	11	4	1	1	100

Homesteads in the Maphephetheni Uplands are situated on hill-tops or along hill slopes. Some households with gentle slopes owned home gardens that produced crops for household consumption. Sizes of home gardens were limited by the drastic increase in slope as one moved towards valley bottoms. Most home gardens had steep slopes and high levels of erosion, and consequently poor soils that reduced crop production. Some household members reported total home garden crop failure due to drought. On the other hand, some households irrigated crops with water harvested from roof-tops during the rainy season in order to avert drought effects.

During periods of food scarcity, some household members opted to work for neighbours and were given in-kind payments in the form of food. Since the in-kind payment recipient had no choice of the type of food to be given, this practice was not popular among household members. It was possible to be paid only one meal in a day for work done and this did not solve daily food requirement of the recipients or households as only those who had worked received a food payment.

Households that had exhausted all available sources of food received food gifts or charity from neighbours as an immediate remedy to lack of food. The volume of food given as gifts was small because most households had limited quantities of food. Food gifts were the most unreliable source of food since most households ran out of food simultaneously.

5.3 Anxiety and uncertainty about household food supply

Most households, 89% of respondents indicated that they were anxious and uncertain about accessing enough food in the past thirty days, but to varying degrees (Table 5.5).

Table 5.5: A**nxiety and uncertainty about having enough food among community gardeners, Maphephetheni Uplands, 2006 (n = 53)**

	Frequency of anxiety and uncertainty in the past 30 days				
	Never	**Once or twice**	**Three to ten times**	**More than 10 times**	**Total**
Percentage household members who were anxious and uncertain about food supply (%)	11	4	36	49	100

Households experienced crop losses through theft, animal damage, floods and drought (Figure 5.4). Crop loss resulting from drought was experienced by most households (Appendix A, caption c). Community gardens were situated far away from homesteads making garden produce vulnerable to theft. Community gardens were not fenced. Animals roaming freely gained access to the gardens and destroyed crops, causing marked decrease in yields.

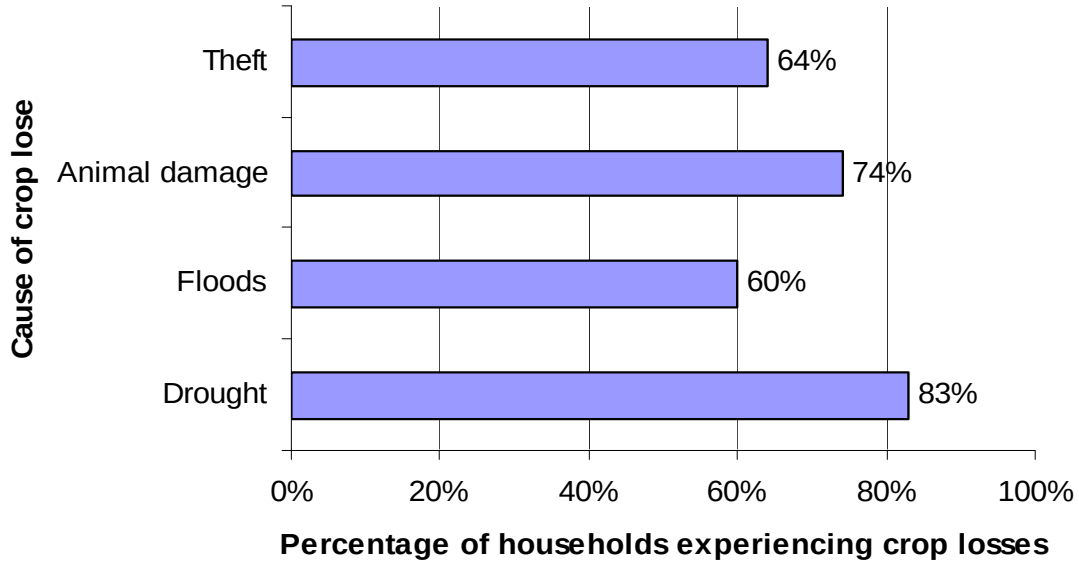


Figure 5.4: Causes of crop losses in community gardens, Maphephetheni Uplands, 2006 (n = 53).

Due to high crop losses, community gardeners had low yields and harvested small quantities over the cropping season (pick and eat), supporting an observation that low agricultural productivity in rural areas in South Africa is a major contributor to household food insecurity (Kristen & Moldenhaver, 2006). Agricultural extension officers rarely visited community gardeners to advise them on appropriate crop production methods and this may have led to community gardeners growing crops using inappropriate methods. Poor crop production methods may have led to decreased yields resulting in increased anxiety and uncertainty about household food supply.

Community gardens in the Maphephetheni Uplands were run by women already overburdened by household chores to the extent that they were unable to dedicate sufficient time to the community gardens (Chingondole, 2006). Inadequate time for tending community gardens may have led to inadequate crop irrigation programmes, late planting or late harvesting, leading to reduced yields and consequently increased anxiety and uncertainty about household food supply. The result confirms earlier findings that there is unpredictable household food production in rural areas of South Africa and households rely on off-farm activities to meet household food needs (NDA, 2002).

5.3.1 Relationships between household anxiety and uncertainty about food supply and household characteristics

Relationships between household anxiety and uncertainty about food supply and household characteristics are shown in Table 5.6. There was a significant positive relationship between household anxiety and uncertainty about food supply and the total value of food from in-kind payments ($r = 0.323$, $p < 0.018$). The relationship showed that households became more anxious and uncertain about household food supply as the proportion of in-kind payments for work done increased, relative to the total value of food consumed. When other sources of food were exhausted, in-kind payments for work done, instead of cash, became a significant source of food among the surveyed community gardeners. During periods of food scarcity, some household members used in-kind payment as a coping strategy by preferring to be paid with food, instead of cash for work rendered.

Table 5.6: Spearman's correlation coefficient between household characteristics and anxiety and uncertainty about food supply among community gardeners, Maphephetheni Uplands, 2006 (n = 53)

	Household anxiety and uncertainty about household food supply
Value of food consumed from each Source	
Purchases	0.153
	(0.274)
Gifts	0.155
	(0.268)
In-kind payments	0.323*
	(0.018)
Community gardens	0.065
	(0.644)
Home gardens	0.065
	(0.644)
Household sources of income	
Household per capita income	-0.128**
	(0.359)
Wages	-0.128
	(0.359)
Social grants	-0.386**
	(0.004)
Migrants	-0.254
	(0.067)
Household and community garden characteristics	
Number of people per household	0.009
	(0.001)
Number of people per community garden	0.639**
	(0.001)

** =Correlation is significant at the 0.01 level (2-tailed).
* =Correlation is significant at the 0.05 level (2-tailed) of statistical significance.
Numbers in brackets refer to the *P* values.

The effect of using in-kind payments as a coping strategy for household food insecurity could be that those household members unable to render services in exchange for food such as, children, the sick, elderly, and disabled people became more vulnerable to food insecurity, causing increased anxiety and uncertainty among household members. In-kind payments were made only once a day, implying that individual recipients could become anxious and uncertain about how they would get the next meal. Recipients of in-kind payment may not have a chance to negotiate the

amount and type of food given, leading to further anxiety and uncertainty about the quantity and/or quality of food received. In-kind payment systems, if adapted by all members of the household could exacerbate household food insecurity because of a breakdown of collective responsibility for seeking longer term strategies to avert food insecurity. Household members may not be concerned with protecting resources like productive assets as strategies to avert food insecurity. This may lead to longer periods of anxiety and uncertainty about food supply.

A negative and significant relationship was observed between household anxiety and uncertainty about food supply and household per capita income and incomes from social grants ($r = -0.128$, $p < 0.359$ and $r = -0.386$, $p < 0.004$ respectively). As incomes from social grants increased and consequently increase in household per capita income, there was a decrease in anxiety and uncertainty about household food supply. Social grants were the main stable source of income among the surveyed community gardeners, 48% of the total income. A similar observation was made by the Alternative Information and Development Centre (AIDC) (2005) stating that black rural households in South Africa are supported by non-agricultural activities to compliment their livelihoods. Although an increase in social grants decreased household anxiety and uncertainty about food supply, grants of R45 per capita per month were inadequate for household food security.

Grants from the government may give a wrong sense of security among household members possibly leading to households using any means to achieve the maximum number of six children per care giver so taking advantage of child grants. However a recent study commissioned by the Department of Social Development showed that children in households receiving grants are more likely to attend school, while adults in such households are more likely to find work and grants have a positive effect on income distribution, productivity, social stability and economic growth (Basic Income Grant Coalition 2005).

There was a significantly positive relationship between household anxiety and uncertainty about food supply and the number of members in a community garden ($r = 0.639$, $p < 0.001$). As the number of households in a community garden increased,

household anxiety and uncertainty about household food supply increased. Community gardens in the Maphephetheni Uplands had an average of 17 households per garden resulting in an average area of 224m^2 per household. The average household size was equivalent to four adult. Crop productivity from community gardens was earlier seen to be low and unpredictable. Demand for food in households may be expected to increase as the general household population is expected to increase due to births and migrant household members retired or retrenched from urban employment returning to the rural areas. Increased household demand for food, against a background of low community garden productivity and diminished alternative sources of household incomes exacerbated household anxiety and uncertainty about food supply. The result supports NDA (2002) findings that limited agricultural production in the former homelands resulted in households unable to feed themselves.

Total average household income among the surveyed households was R134.8 per capita per month. It comprised of wages and salaries, 44% of total income; social grants, 48%; and migrant remittances, 8%. Household incomes were low, considering that the ultra poor category of households in South Africa in 2005 was estimated as receiving less than R258 per capita per month. Alternative sources of income in the Maphephetheni Uplands were limited and seasonal and included road works and water projects. Agricultural activities that could create employment were insufficient because of limited agricultural land. Women, already overburdened by household chores, were the main participants in income generating activities among the surveyed households. Tired women may not effectively contribute to income generating activities and this may lead to low incomes from such activities.

Each household participating in the survey produced crops from community gardens worth 49 cents per square meter per year (Table 5.7). The average total value of commodities from community gardens for surveyed households in a season was 224 m^2 X 49 cents = R110 (11% of total value of food consumed) (Chingondole, 2006). Community garden contributions to household food requirements were low due to reasons considered earlier and this contributed to increased anxiety and uncertainty about household food supply. The low value of produce from community gardens

indicated that community gardens were not able to sustain household food requirements. Instead, increased household food demand may increase demand for cultivation of community gardens, reducing crop productivity due to over tilling of soils, further deteriorating soils through leaching and erosion if not managed well. Essentially, continued under-productivity of community gardens may mean that community gardens may not be an option to alleviating food insecurity among community gardeners in the Maphephetheni Uplands unless well managed in terms of soil fertility and conservation of soil nutrients.

Table 5.7: Value of commodities from community gardens per household per metre square among community gardeners, Maphephetheni Uplands, 2006 (n = 53)

Community garden	Total area of garden (m^2) (a)	Number of households /garden (b)	Total value of commodities/ garden/season (Rand) (c)	Rand equivalent/ household / season(Rand) (c) / (b) = (d)	Average area/ household (m^2) (a) /(b) = (e)	Rand equivalent/ household/m^2 (Rand) (d) /(e)
Inkanyezi	4500	26	876	34	173	0.20
Siyazama	4500	25	1139	46	180	0.26
Thathani	3920	11	883	80	356	0.22
Sizathina	1600	11	4033	367	145	2.53
Nkululekweni	1920	7	76	11	274	0.04
Siphamandla	4200	16	620	39	263	0.15
Siyajabula	4500	25	15	1	180	0.01
Average	**3591**	**17**	**1091**	**82**	**224**	**0.49**

5.4 Insufficient quality of food consumption

Coates et al (2006) used questions 2-4 of the HFIAS to address insufficient quality of food consumption. Question 2, “not able to eat foods they preferred” asks whether any household member was not able to eat according to their preference due to lack of resources. Question 3, “eating just a few kinds of food” asks about dietary choices related to variety. Question 4, “eating foods that are not preferred” asks whether household members had to eat food they found socially or personally undesirable due to lack of resources.

Among the surveyed households, 94% of the households reported that they were not able to eat preferred kinds of food, 95% consumed a limited variety of foods and 100% reported consuming foods they preferred not to eat at some point in the month (Table 5.8).

Table 5.8: Household responses to poor quality food consumption household behaviours in the past 30 days among community gardeners, Maphephetheni Uplands, 2006 (n = 53)

	Percentage of households that used poor quality food household behaviours used in the last 30 days				
Poor quality food consumption household behaviours	Never	Once or twice	Three to ten times	More than 10 times	Total
Not able to eat preferred kinds of foods	6	11	23	60	100
Eating a limited variety of foods	5	13	23	59	100
Eating foods that are not preferred	0	15	26	58	100

According to Coates et al (2006), these categories correspondingly represented least severe, intermediate and most severe household behaviours respectively. For each of the three household behaviours, 58% - 60% of households had used these household behaviours for more than one third of the month.

Households produced little from community and home gardens. They produced a few staple foods including maize, *amadumbe,* taro and some horticultural crops. As discussed earlier, households relied on purchases as the main source of food that could not be sustained by low incomes. Lack of diversity in crops produced from community and home gardens (Chingondole, 2006) coupled with low incomes inhibited consumption of quality foods. Household members purchased cheaper foods from local spaza shops, vendors or super markets in Durban and Hillcrest.

Consumption of poor quality foods could have a spiral effect on household food security. Young children may receive poor quality food and show poor cognitive development and poor school performance. Such poor performers fall out of school and are unable to secure well paying jobs, consequently becoming a food insecurity burden to households. Mature household members receiving inadequate supplies of quality food become vulnerable to vitamin and mineral deficiencies (FAO, 2005b). Sick household members may not be able to contribute to household food security; instead other household members spend time and resources taking care of the sick, further increase food insecurity. Pregnant mothers unable to access good quality foods may give birth to poorly developed children who may not effectively contribute to household food security when mature, further pushing the household to greater food insecurity levels (Quisumbing & Meinzen-Dick, 2001). Household members requiring specialised diets, like infants, the sick and elderly risk developing medical complications due to inadequate quality food.

5.4.1 Relationships between quality of food and factors contributing to food insecurity among community gardeners

Analysis of the relationship between poor quality food household behaviours and community garden household characteristics are shown in Table 5.9. There was a negative and significant relationship between household per capita income and all the three poor quality food consumption household behaviours, namely not able to eat the

kinds of preferred foods (r = -0.523, p < 0.001); consumption of a limited variety of foods (r = -0.538, p < 0.001); and consumption of foods not preferred (r = -0.464, p < 0.001). Social grants were the stable contributor to household income and consequently had similar relationship to poor quality food consumption strategies as household per capita income, not able to eat the kinds of preferred foods (r = -0.452, p < 0.001); consumption of a limited variety of foods (r = -0.523, p < 0.001); and consumption of foods not preferred (r = -0.540, p < 0.001).

Table 5.9: Spearman's correlation coefficient between household characteristics and quality of food consumed among community gardeners, Maphephetheni Uplands, 2006 (n = 53)

	Quality of food consumed by households		
	Not able to eat preferred kinds of foods	Eating a limited variety of foods	Eating foods that are not preferred
Household sources of income			
Household per capita income	-0.523** (0.001)	-0.538** (0.001)	-0.464** (0.001)
Wages or salaries earned	0.076 (0.589)	0.122 (0.358)	0.230 (0.098)
Social grants	-0.452** (0.001)	-0.523** (0.001)	-0.540** (0.001)
Migrant remittances	-0.459** (0.001)	-0.268 (0.052)	-0.355 (0.009)
Household and community garden characteristics			
Number of household members	-0.043 (0.757)	0.096 (0.496)	-0.026 (0.855)
Size of community garden	-0.624** (0.001)	-0.546** (0.001)	-0.674** (0.001)
Number of community garden members	0.542** (0.002)	0.424** (0.002)	0.445** (0.002)

** =Correlation is significant at the 0.01 level (2-tailed).
* =Correlation is significant at the 0.05 level (2-tailed) of statistical significance.
Numbers in brackets refer to the *P* values.

The results indicated that as household income from social grants decreased and consequently decrease in household per capita income, household members used all three poor quality food consumption household behaviours more often. Surveyed households did not have adequate incomes and consumed poor quality foods and could suffer consequences as discussed earlier. The finding supports Bonti-

Ankomah's (2001) observation that in South Africa, households in rural areas have limited livelihood strategies and depend on limited incomes.

A significant and negative relationship was observed between migrant remittances and the least severe food quality consumption strategy, the inability of households to eat preferred kinds of foods ($r = -0.459$, $p < 0.001$). As migrant remittances decreased, household members ate preferred kinds of foods less frequently. Households among the surveyed community gardeners received unreliable small incomes from migrant remittances. The small income from migrant remittances contributed to community gardeners not being able to eat the kinds of food they preferred.

There was a negative and significant relationship between the size of community gardens and the poor quality food consumption household behaviours: Unable to eat preferred kinds of foods ($r = -0.624$, $p < 0.001$); ate a limited variety of foods ($r = -0.546$, $p < 0.001$) and ate foods not preferred ($r = -0.674$, $p < 0.001$). The result indicates that as the size of community gardens decreased, households used all the three poor quality food household behaviours more frequently. Community gardens were small, implying that households used poor quality food household behaviours more frequently with negative consequences as discussed earlier. This finding supports the NDA (2002) results that there is unstable household food production in the former homelands of South Africa.

A significant and positive relationship was observed between the number of community garden members and the application of poor quality food consumption strategies: Unable to eat preferred kinds of foods ($r = 0.542$, $p < 0.001$); ate a limited variety of foods ($r = 0.424$, $p < 0.001$) and ate foods not preferred ($r = 0.445$, $p < 0.002$). As the number of community garden members increased per garden, households used the poor quality food consumption strategies more frequently with possible negative implications as discussed earlier.

5.5 Insufficient quantities of food consumed

Households in the Maphephetheni Uplands responded to a lack of sufficient quantity of food by using five key household behaviours to varying degrees (Table 5.10). The

household behaviours used in order of severity were: eating smaller meals, least severe coping strategy; eating fewer meals in a day; experiencing a total lack of food due to lack of resources; going to sleep at night hungry due to lack of food and going whole day and night without eating anything due to lack of food, the most severe coping strategy. The proportion of households who used these household behaviours were 83%, 90%, 76%, 42% and 31% respectively at some point in the month.

Table 5.10: Household responses to an inadequate quantity of food, Maphephetheni Uplands, 2006 (n = 53)

	Percentage of households who used household behaviours in the last 30 days (% of households)				
Inadequate quantity of food household behaviours	Never	Once or twice	Three to ten times	More than 10 times	Total
Eating a smaller meal	17	6	32	45	100
Eating fewer meals in a day	10	9	34	47	100
Experiencing total lack of food due to lack of resources	24	28	40	8	100
Going to sleep at night hungry due to lack of food	58	21	17	4	100
Going whole day and night without eating anything due to lack of food	69	4	19	8	100

Most surveyed households used the first three household behaviours implying that they generally consumed insufficient quantities of food. Consumption of an insufficient quantity of food may lead to weak household members unable to contribute effectively to household activities requiring physically strong individuals. Weak individuals may be unable to work effectively and contribute to household food security activities, exacerbating household food insecurity.

Household members consuming inadequate quantities of food may become prone to diseases due to malfunctioning body systems. Sick household members may require treatment and care-giving, leading to vicious cycles of food insecurity with consequences as discussed earlier. This finding supports UNDP's (2003) indication that sick household members may cause the sale of productive household assets with minimal chances of recovery in such a household. In extreme cases of lack of food, household members may resort to unethical and demeaning methods of getting food including begging, eating from dustbins, prostitution, theft or robbery. These methods may lead to a household member contracting diseases like diarrhoea from eating out of dustbins, or HIV/AIDS from prostitution. Those who engage in activities like theft or robbery may be jailed. In all these cases, a household may lose a member and this may have a negative impact on household food security as discussed earlier.

5.5.1 Relationships between insufficient food consumption and factors contributing to food security

Analysis of the relationships between household sources of income, household and community garden characteristics and the frequency of using household behaviours associated with insufficient food consumption is shown in Table 5.11 There was a negative and significant relationship between household per capita income and eating smaller meals and eating fewer meals per day ($r = -0.258$, $p < 0.062$) and ($r = -0.568$, $p < 0.001$ respectively). This showed that as household per capita income decreased, there was a corresponding increase in frequency of using these two household behaviours. Households had low incomes, leading to the use of the two household behaviours more frequently. A significant and negative relationship existed between social grants and the frequency at which household members ate fewer meals in a day ($r = -0.400$, $p < 0.003$). This relationship showed that an increase in social grants led to a decrease in the frequency at which household members used this coping strategy. Social grants were the main contributor to household income which was overall low. Consequently, households ate fewer meals in a day.

Table 5.11: Spearman's correlation coefficient between household and community garden characteristics versus household behaviours associated with insufficient food consumption, Maphephetheni Uplands, 2006 (n = 53)

	Household behaviours				
	Eating a smaller meal	Eating fewer meals in a day	Experiencing total lack of food due to lack of resources	Going to sleep at night hungry due to lack of food	Going whole day and night without eating anything due to lack of food
Household sources of income					
Household per capita income	-0.258**	-0.568**	-0.010	-0.004	-0.032
	(0.062)	(0.001)	(0.943)	(0.764)	(0.818)
Wage or salary	0.233	0.111	-0.005	-0.049	-0.059
	(0.093)	(0.430)	(0.970)	(0.725)	(0.625)
Social grant	-0.310	-0.400*	-0.085	-0.041	-0.024
	(0.024)	(0.003)	(0.543)	(0.770)	(0.863)
Migrant remittances	-0.224	-0.151	0.088	0.106	0.265
	(0.107)	(0.279)	(0.533)	(0.449)	(0.055)
Household and community garden characteristics					
Number of people in household	0.210	0.126	0.112	0.193	0.135
	(0.132)	(0.368)	(0.423)	(0.166)	(0.334)
Number of community garden members	0.232*	0.368**	0.266	-0.049	-0.121
	(0.094)	(0.007)	(0.054)	(0.725)	(0.387)
Area of community garden per household	-0.370**	-0.443**	0.060	-0.009	-0.081*
	(0.006)	(0.001)	(0.178)	(0.949)	(0.566)

** =Correlation is significant at the 0.01 level (2-tailed).

* =Correlation is significant at the 0.05 level (2-tailed) of statistical significance.

Numbers in brackets refer to the *P* values.

A positive and significant relationship was observed between the number of community garden members and the first two household behaviours associated with inadequate food consumption ($r = 0.232$, $p < 0.094$) and ($r = 0.368$, $p < 0.004$) respectively. As the number of community garden members increased, the frequency at which households used the first two household behaviours increased. It was established earlier that community gardens were small and households were allocated

a small portion of the community gardens. As the area of community garden allocated to each household decreased, there was a corresponding increase in the frequency at which households ate a smaller meal than needed, having to eat fewer meals in a day and having to go whole day and night without eating due to lack of food, ($r = 0.370$, $p < 0.006$), ($r = 0.443$, $p < 0.001$) and ($r = -0.081$, $p < 0.566$) respectively.

5.6 Household Food Insecurity Access Scale score (HFIAS score)

On a scale of 0 – 27 (27 = most severe food insecurity), households among surveyed community gardeners had an average HFIAS score of 16.2. Figure 5.5 shows the distribution of individual HFIAS scores. The minimum HFIAS score was 4 and the maximum was 27.

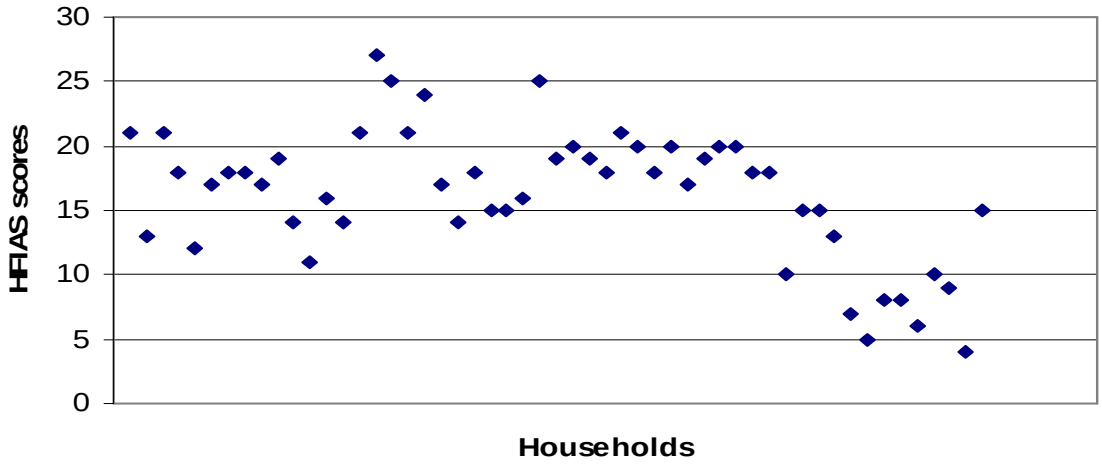


Figure 5.5: Scatter plot of Household Food Insecurity Access Scale (HFIAS) scores among community gardeners, Maphephetheni Uplands, 2006 (n = 53).

5.6.1 Relationships between HFIAS scores and factors contributing to food security

A comparison of HFIAS scores and household sources of income and food was carried out (Table 5.12).

Table 5.12: Pearson's correlation coefficients between HFIAS scores and household sources of income and food among community gardeners, Maphephetheni Uplands, 2006 (n = 53)

	HFIAS score
Sources of household income	
Household per capita income	-0.604**
	(0.001)
Wage or salary earned	0.134
	(0.339)
Social grant	-0.526**
	(0.001)
Migrant remittances	-0.078
	(0.578)
Sources of food	
Purchases	0.348*
	(0.011)
Gifts	0.265
	(0.056)
In-kind payments	0.213
	(0.126)
Community gardens	-0.054
	(0.703)
Home gardens	0.048
	(0.733)
Household and community garden characteristics	
Number of members in community garden	0.543**
	(0.001)
Size of community garden (square metres)	-0.594**
	(0.001)
Number of people in household	0.142
	(0.310)
Visit by agricultural extension officer	-0.329*
	(0.016)

* =Correlation is significant at the 0.05 level (2-tailed).
** =Correlation is significant at the 0.01 level (2-tailed).
Note: Numbers in brackets refer to *P* values.

A negative and significant relationship was observed between the HFIAS score and household per capita income and social grants ($r = -0.604$, $p < 0.001$) and ($r = -0.526$, $p < 0.001$) respectively. As household income from social grants decreased and

similarly household per capita income, there was a corresponding increase in the HFIAS scores. Low household per capita income among surveyed community gardeners implied that generally households would have high HFIAS scores. High HFIAS scores could have resulted from households being anxious and uncertain about household food supply, consuming poor quality food or inadequate quantities of food at varying frequencies. The implications of such states of food insecurity are discussed earlier.

A positive and significant relationship ($r = 0.348$, $p < 0.011$) was observed between the HFIAS score and the total value of food from purchases. As the value of food consumed from purchases increased, there was a corresponding increase in the HFIAS score. Households among surveyed community gardeners had low incomes. Increasing food purchases in low income households implied such households may became more anxious and uncertain about food supply; consumed poor quality and inadequate quantities of food more frequently leading to higher HFIAS scores. The consequences of such actions may have negative impacts on households as discussed earlier.

Significant relationships were observed between HFIAS scores and number of members in a community garden, size of community garden and visits by extension officers ($r = 0.543$, $p < 0.001$, $r = -0.594$, $p < 0.001$ and $r = -0.329$, $p < 0.016$ respectively). An increase in the number of community garden members in a garden led to increased HFIAS scores, increasing the size of community gardens resulted in decreased HFIAS scores and increased visits by extension officers to community gardens led to a decrease in HFIAS scores. Community gardens had a fixed size and many members, resulting in small plot sizes per household and correspondingly high HFIAS scores. Community gardens were rarely visited by extension officers. The consequences of high HFIAS scores were discussed earlier.

5.7 Household food insecurity access prevalence

Surveyed households were grouped into food security categories depending on their responses to anxiety and uncertainty about food supply and frequency of using

household behaviours (Table 5.13). A high proportion, 88.7% of surveyed households participating in community gardens in the Maphephetheni Uplands were severely food insecure. No households were food secure, according to the classification. As discussed earlier, most households were anxious and uncertain about food availability. They frequently used household behaviours associated with poor quality food consumption and the first three household behaviours associated with insufficient quantities of food intake. This led to most of the surveyed households being severely food insecure. The implications of households being anxious about food supply, consuming poor quality and insufficient quantities of food have been discussed.

Table 5.13: Proportion of household in each food security category, Maphephetheni Uplands, 2006 (n = 53)

	Food security categories (Coates et al, 2006)			
	Food secure	Mildly food insecure	Moderately food insecure	Severely food insecure
Number of household in each category	0	1	4	48
Proportion of households in each category (%)	0	3.8	7.5	88.7

5.7.1 Relationships between food insecurity prevalence and factors contributing to food security

Analyses were carried out to investigate the relationships between food insecurity categories and household and community garden characteristics (Table 5.14). A negative and significant relationship was observed between food insecurity categories and social grants and consequently household per capita income ($r = -0.435$, $p < 0.001$ and $r = -0.465$, $p < 0.001$ respectively). As established earlier, surveyed households had low incomes resulting in higher food insecurity and anxiety about food supply and frequent use of the household behaviours. The implications of this state of food insecurity have been discussed.

Table 5.14: Spearman's correlation coefficient between household food insecurity categories and household and community garden characteristics, Maphephetheni Uplands, 2006 (n = 53)

Sources of household income per month	**Household food insecurity category**
Household per capita income	-0.435**
	(0.001)
Wage or salary earned	0.013
	(0.926)
Social grant	-0.465**
	(0.001)
Migrant remittances	0.134
	(0.340)
Household and community garden characteristics	
Number of members in community garden	0.283*
	(0.040)
Size of community garden (square metres)	-0.463**
	(0.001)
Number of people in a household	0.007
	(0.961)
Visit by agricultural extension officer	-0.153
	(0.275)

* =Correlation is significant at the 0.05 level (2-tailed).
** =Correlation is significant at the 0.01 level (2-tailed).
Note: Numbers in brackets refer to *P* values.

Significant relationships were observed between household food insecurity categories, the number of community garden members and the size of community gardens, ($r = 0.283$, $p < 0.040$ and $r = -0.463$, $p < 0.001$ respectively). As the number of members in a community garden increased, households showed higher food security levels. As established earlier, there were many members per community garden, leading to

smaller household plots and low crop production resulting in higher food security levels. Surveyed community gardens were small resulting in higher food security categories with possible food insecurity consequences as discussed earlier.

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

This study set out to evaluate the contribution of community gardens towards alleviating food insecurity in the Maphephetheni Uplands using the Household Food Insecurity Access Scale (HFIAS). The following key sub-problems were addressed:

- Do households participating in community gardens in the Maphephetheni Uplands have anxiety and uncertainty about their household food supply?

- Do households participating in community gardens in the Maphephetheni Uplands consume a variety of preferred food?

- Do households participating in community gardens in the Maphephetheni Uplands consume sufficient quantities of food?

- What is the prevalence of food insecurity among households participating in community gardens in the Maphephetheni Uplands as measured by the Household Food Insecurity Access Scale (HFIAS)?

The results of the study were obtained using a questionnaire and focus group discussion developed to collect data on household demographics, food consumption patterns and responses to HFIAS questions among households participating in community gardens in the Maphephetheni Uplands. Focus group discussions were used to get a deeper understanding of participant feelings about their household food security situation. A total of 53 household representatives from seven community gardens participated in the survey. All community garden participants were invited to participate in the survey. All attendees participated in the survey.

The HFIAS tool adequately captured household food insecurity (access) levels in terms of anxiety and uncertainty, quality and quantity of food consumed. The food utilisation component should have been included in the tool so that the full scale

enquiry in household food security could be achieved. It took approximately 20 minutes to complete the nine HFIAS questions per respondent. This was ample time to cover many households in a short period of time. Adapting the questionnaire using key informants and representatives from the survey population was very useful in making it easier for the respondents to adequately answer the questionnaire.

In the Maphephetheni Uplands, household incomes were low and unreliable among the surveyed community garden participants. The main source of income was from social grants. Other sources of income included wages, salaries and migrant remittances. Purchases were the main source of household food. Other sources of food included gifts, in-kind payments and community and home gardens. Low incomes contributed to increased household anxiety and uncertainty about food supply and frequent use of household behaviours.

Agricultural production contributed somewhat to household food supply. Crops were cultivated in community gardens and fewer crops were produced in home gardens. Plots in community gardens were small resulting in low crop production. High levels of crop loss occurred through floods, droughts, animal damage and thefts. Community gardeners did not practice appropriate crop production methods leading to low yields. Women were the managers of the community gardens. Already overburdened by household chores, women could not give full attention to community gardens and this contributed to inadequate production. Low and unpredictable crop production significantly contributed to increased anxiety and uncertainty about household food supply and frequent use of household behaviours. A combination of low income and low agricultural production resulted in households consuming low quality and quantity food and most households had high HFIAS scores thus falling into higher food insecurity categories.

Most households, 88.7% were classified as severely food insecure and their HFIAS scores ranged from 4 to 27. Within the severely food insecure category, the tool was not able to give guidance on the cut off point on the severity of food insecurity for intervention targeting purposes. In responding to questions two and three of the HFIAS, difficulty was experienced in differentiating between “not able to eat

preferred kinds of foods" and "eating a limited variety of foods". However, by using relevant examples, respondents appreciated the difference in the questions.

6.1 Conclusions

Households participating in community gardens in the Maphephetheni Uplands were generally severely food insecure. Households depended on purchases as the main source of food. Household incomes were inadequate and irregular to maintain adequate household food requirements. Social grants were the main stable source of income but were too low to meet household food requirements. Other sources of income that included migrant remittances and wages were low and unreliable.

Community gardens, acting as a supplement to household food supply were limited in terms of size and overall crop productivity. Yields were low and unpredictable resulting in reduced availability of food to households. Since community garden sizes were fixed by the nature of the terrain, yields from community gardens could be improved by increasing unit area production by using appropriate crop production methods provided through the agricultural extension services. Community gardens could be used for short term production of high value and nutritious crops like vegetables, carrots and other horticultural crops. These crops could increase household food diversity and surplus crops could be sold and incomes used to purchase other crops such as maize and potatoes, hence increasing total household food requirements. Intensive and successive cropping systems could be practiced in community gardens using adaptable crops, ensuring crop production throughout the year. Fencing of community gardens will keep animals away and increase total food available to households.

Other sources of food including in-kind payments, home gardens and gifts contributed insignificantly to household food supply. Although home gardening was limited by the nature of terrain, community gardeners could improve crop production from home gardens through locally available appropriate technologies. Use of organic fertilisers and terracing of sloping land could improve home garden crop production. Planting of fruit trees around the home compounds could significantly contribute to dietary

diversity among community gardeners. Surplus produce could be sold contributing to household incomes that may be used for food purchases.

Community gardens were insufficient to significantly contribute to household food security among households participating in community gardening in the Maphephetheni Uplands. Though community gardens did not make households in the Maphephetheni Uplands food secure, the contribution to food security may not be ignored. Improvement of community and home garden productivity could contribute significantly to household food security. Alternative sources of income are seen to be a solution to food insecurity among community gardeners in the Maphephetheni Uplands.

6.2 Recommendations for improvement of the study

The methodology could have included a participatory process during the interview sessions in which greater participant contribution could have been achieved through small group discussions. This result could give a wider scope on the contribution of community gardens to household food security in the Maphephetheni Uplands.

A semi-structured interview with key informants or community leaders could have been included in the methodology. Information from such interaction could have provided a more informed opinion on the contribution of community gardens to food security in the Maphephetheni Uplands.

In order to have an in-depth understanding of the food security situation of community gardeners in the Maphephetheni Uplands over time, time series data could have been collected. This could give an indication of the nature of food insecurity, whether transitory, cyclical or chronic.

6.3 Policy implications and recommendations for improvement of community garden programmes

It is recommended that appropriate agricultural and nutritional advice be given to household members participating in community gardens through government agricultural extension officers to the improve quality and quantity of food from community gardens. Households should be advised on the appropriate combination of crops to be grown with the objective of ensuring that crops meet household dietary needs. Household members should be taught appropriate crop production practices with the aim of increasing community garden productivity through the use of improved seed, utilisation of both organic and inorganic fertilisers and adequate pest and disease control.

The Maphephetheni Uplands community should look into ways in which crop theft from gardens can be controlled by monitoring and punishing culprits. Community gardens should be fenced to keep animals away. Income generating activities managed by the community should be initiated to address household food security. Community gardeners should employ cost effective crop production methods such as permaculture and the use of compost as raised beds on which crops can be grown around the homesteads.

The government should support agricultural extension services in the Maphephetheni Uplands so that community garden production can be improved through use of appropriate agricultural production methods. Through the current land restitution, redistribution and land tenure programmes, the government should consider relocating some of the households in the Maphephetheni Uplands because the area is agriculturally marginal and has exceeded its population carrying capacity.

Investigations need to done on how community garden household members can be involved in non-farm economically viable projects to increase household incomes. Crop losses in most community gardens were mainly as a result of droughts. It is recommended that irrigation systems should be established on community gardens close to water sources. Where irrigation is not possible, drought tolerant varieties can be introduced in order to increase crop yields. Irrigation and drought tolerant crops

could ensure crop production is possible even during the dry periods addressing the food quality and quantity problems in the Maphephetheni Uplands.

6.4 Recommendations for further research

The study gave an understanding of the food security situation of community gardeners in the Maphephetheni Uplands as related to food availability and access. Further research should be done in order to quantify the food utilisation component among community gardeners. This will give a total indication of an all inclusive household food security levels among community gardeners.

There is need to conduct a comparative food security study among households involved in, and those not involved in, community gardens. This study could quantify the contribution of community gardens to household food security in the Maphephetheni Uplands.

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APPENDIX A

PHOTOS OF MAPHEPHETHENI UPLANDS

Caption (a): Rugged terrain of the Maphephetheni uplands, 2006

Caption (b): A household plot in a community garden, 2006

Caption (c): A dried up irrigation water source, 2006

Caption (d): Survey in progress, 2006

APPENDIX B
SURVEY QUESTIONNAIRE

Maphephetheni
HOUSEHOLD, COMMUNITY GARDENS AND FOOD ACCESS QUESTIONNAIRE

The information captured in this questionnaire is strictly confidential and will be used for research purposes by staff and students at the University of KwaZulu-Natal to measure if community gardens have contributed to food security of participating households in Maphephetheni. Respondents do not have to answer questions – answers are voluntary. The respondent should be a participant in the community gardens.

Interviewer: _____

Date: _____

UNIVERSITY OF
KWAZULU-NATAL

Respondent’s name:		Household number:		GPS coordinate:	

PART A

Please indicate the names of household members. **(Use an extra form if more than 10 household members)**	**Write the names of all household members**									
	1…… HEAD	**2…..**	**3…..**	**4…..**	**5…..**	**6…..**	**7…..**	**8…..**	**9…..**	**10…..**
1. Is …… Male or female	☐ M ☐ F	☐ M ☐ F	☐ M ☐ F	☐ M ☐ F	☐ M ☐ F	☐ M ☐ F	☐ M ☐ F	☐ M ☐ F	☐ M ☐ F	☐ M ☐ F
2. Age in years	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
3. Highest level of **completed** schooling or educational training (years or grade) more than matric = 13 years	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
4. Occupation										
1 = WAGE EMPLOYED	☐ 1	☐ 1	☐ 1	☐ 1	☐ 1	☐ 1	☐ 1	☐ 1	☐ 1	☐ 1
2 = FARMER	☐ 2	☐ 2	☐ 2	☐ 2	☐ 2	☐ 2	☐ 2	☐ 2	☐ 2	☐ 2
3 = SELF-EMPLOYED (E.G. TAXIS OPERATOR, SHOP KEEPER)	☐ 3	☐ 3	☐ 3	☐ 3	☐ 3	☐ 3	☐ 3	☐ 3	☐ 3	☐ 3
4 = HOUSEKEEPER	☐ 4	☐ 4	☐ 4	☐ 4	☐ 4	☐ 4	☐ 4	☐ 4	☐ 4	☐ 4
5 = PENSIONER	☐ 5	☐ 5	☐ 5	☐ 5	☐ 5	☐ 5	☐ 5	☐ 5	☐ 5	☐ 5
6 = DISABLED	☐ 6	☐ 6	☐ 6	☐ 6	☐ 6	☐ 6	☐ 6	☐ 6	☐ 6	☐ 6
7 = UNEMPLOYED BUT SEEKING WORK	☐ 7	☐ 7	☐ 7	☐ 7	☐ 7	☐ 7	☐ 7	☐ 7	☐ 7	☐ 7
8 = SCHOLAR	☐ 8	☐ 8	☐ 8	☐ 8	☐ 8	☐ 8	☐ 8	☐ 8	☐ 8	☐ 8
9 = INFANT OR CHILD (0 – 6 YEARS)	☐ 9	☐ 9	☐ 9	☐ 9	☐ 9	☐ 9	☐ 9	☐ 9	☐ 9	☐ 9
10 = VAGRANT	☐10	☐10	☐10	☐10	☐10	☐10	☐10	☐10	☐10	☐10
5. Wage or salary income (Rands per month)	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
6. Income from social grants ie pension, child grant, disability (Rands per month)	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____

7. Income remitted by migrants and commuters (Rands per month)	____	____	____	____	____	____	____	____	____	____
8. If the household head is a migrant or weekly commuter, who is the *de facto* household head?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

	Person (respondent) number									
	1…… HEAD	**2…..**	**3…..**	**4…..**	**5…..**	**6…..**	**7…..**	**8…..**	**9…..**	**10…..**
9. During the past year did any household member earn income through any of the enterprises listed below? If yes, report the income from each activity.	☐ **Y** ☐ **N**	☐ **Y** ☐ **N**	☐ **Y** ☐ **N**	☐ **Y** ☐ **N**	☐ **Y** ☐ **N**	☐ **Y** ☐ **N**	☐ **Y** ☐ **N**	☐ **Y** ☐ **N**	☐ **Y** ☐ **N**	☐ **Y** ☐ **N**
9.1 Hiring out accommodation	____	____	____	____	____	____	____	____	____	____
9.2 Hiring out contractor services or equipment	____	____	____	____	____	____	____	____	____	____
9.3 Milling grain	____	____	____	____	____	____	____	____	____	____
9.4 Baking, brewing or selling meals	____	____	____	____	____	____	____	____	____	____
9.5 Building or repairing houses	____	____	____	____	____	____	____	____	____	____
9.6 Block making, stone- or metalwork	____	____	____	____	____	____	____	____	____	____
9.7 Hawking	____	____	____	____	____	____	____	____	____	____
9.8 Shop-keeping										

9.9 Selling of firewood										
9.10 Making furniture or handicrafts										
9.11 Home garden										
9.12 Community garden										
9.13 Selling of traditional medicine										
9.14 Other, specify:										

10. Which months of the year did your household: (*Tick the appropriate boxes)*

	Jun 05	Jul 05	Aug 05	Sept 05	Oct 05	Nov 05	Dec 06	Jan 06	Feb 06	March 06	April 06	May 06
10.1 Have excess food and had to sale some or give away?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
10.2 Have just enough food for household only?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
10.3 Experience hunger?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

11 Ownership of assets

FOR EACH ITEM, ASK: Does the household own (Asset) and of what value is it?

Productive assets	
11.1 Cows	☐ **Y** ☐ **N**
11.2 Sheep	☐ **Y** ☐ **N**
11.3 Goats	☐ **Y** ☐ **N**
11.4 Chicken	☐ **Y** ☐ **N**
11.5 Pigs	☐ **Y** ☐ **N**
11.6 Ox plough	☐ **Y** ☐ **N**
Non productive assets	
11.7 House	☐ **Y** ☐ **N**
11.8 Television	☐ **Y** ☐ **N**
11.9 Radio	☐ **Y** ☐ **N**
11.10 Jewellery	☐ **Y** ☐ **N**

PART B

12 In this section we look at the characteristics of the household Community gardens

12.1 Name of community garden:	
12.2 Number of people participating in community garden:	
12.3 What is the approximate size of your community garden (M^2)?	
12.4 Do you use fertilizers on your community garden?	☐ **Y** ☐ **N**
12.5 How often are you visited by an agricultural extension officer?	☐ **frequently** ☐ **less freq** ☐ **Not visited at all**
12.6 Is the size of your community garden enough for the members?	☐ **Y** ☐ **N**
12.7 Do you use manure on your community gardens?	☐ **Y** ☐ **N**
12.8 Do you irrigate your crops	☐ **Y** ☐ **N**
12.9 How often do you use hired labour on community garden?	☐ **Very often** ☐ **less often** ☐ **Not at all**
12.10 Do you often experience crop loses?	☐ **Y** ☐ **N**
Crop loses are normally due to :	
12.11 Animal damage?	☐ **Y** ☐ **N**
12.12 Floods?	☐ **Y** ☐ **N**
12.13 Drought?	☐ **Y** ☐ **N**
12.14 Theft?	☐ **Y** ☐ **N**
12.15 Pests and diseases?	☐ **Y** ☐ **N**
12.16 Our household received enough food from the community garden	☐ **Y** ☐ **N**

PART C

13. In this section, we look at the measurement of household food insecurity using the Household Food Insecurity Access scale (HFIAS)

For each of the following questions, consider what has happened in the past 30 days. Please answer whether this happened, never = 0, rarely (once or twice) = 1, sometimes (3-10 times) = 2, or often (more than 10 times) = 3 in the past 30 days?

RESPONSE OPTIONS
0 = Never **1 = Rarely (once or twice in the past 30 days** **2 = Sometimes (three to ten times in the past 30 days** **3 = Often (more than 10 times) in the past 30 days**

NO	QUESTION	RESPONSE OPTION
13.1	Were you worried that your family would run out of food?	☐ **0** ☐ **1** ☐**2** ☐ **3**
13.2	Did you and your family members eat the types of food that you did not like because of lack of resources?	☐ **0** ☐ **1** ☐**2** ☐ **3**

13.3	Did you or a member of your family eat, each day, less varied food because of lack of enough food or resources to buy food?	☐ **0**	☐ **1**	☐**2**	☐ **3**
13.4	Did you or a family member eat the food that you would not want to eat because you did not have food or resources to buy food?	☐ **0**	☐ **1**	☐**2**	☐ **3**
13.5	Did you or a member of your family eat less food than what you would have wanted because of lack enough food?	☐ **0**	☐ **1**	☐**2**	☐ **3**
13.6	Did you or a member of your family eat lesser number of meals because of lack of enough food?	☐ **0**	☐ **1**	☐**2**	☐ **3**
13.7	Was there a time that your family did not have food because of no resources to buy food?	☐ **0**	☐ **1**	☐**2**	☐ **3**
13.8	Did it happen that you or a member of your family went to sleep without eating because there was no food?	☐ **0**	☐ **1**	☐**2**	☐ **3**
13.9	Did it happen that you or a member of your family went for a whole day without eating because there was no enough food?	☐ **0**	☐ **1**	☐**2**	☐ **3**

14. Open ended questions for focus group discussion

14.1 What are some of the issues that may make you become anxious and uncertain about family food supply?

14.2 What are some of the factors that affect your consumption of a variety of the types of food you prefer?

14.3 What could be some of the issues that affect your consumption of sufficient quantities of food?

THANK YOU FOR PARTICIPATING IN THIS SURVEY

APPENDIX C
CODE LIST

Respondent number	resp_no		
Gender of respondent	gender	Male = 1	
		Female= 2	
Age of respondent	age		
Education of respondent	sch_yrs		
Occupation of respondent	occupa	wage employed =	1
		Farmer =	2
		Self employed =	3
		Housekeeper =	4
		Pensioner =	5
		Disabled =	6
		Unemployed =	7
		Scholar =	8
		Infant =	9
		Vagrant =	10

Number of household members		hh_numbe
Total income in a household		income
Number of months in a year household had excess food		foo_exce
Number of months in a year household had just enough food		foo_enou
Number of months in a year household went hungry		foo_hung
Ownership of cows	ass_cow	Yes = 1

		No = 0
Ownership of sheep	ass_shee	Yes = 1
		No = 0
Ownership of goat	ass_goat	Yes = 1
		No = 0
Ownership of chicken	ass_chic	Yes = 1
		No = 0
Ownership of pigs	ass_pigs	Yes = 1
		No = 0
Ownership of Ox-plough	ass_oxpl	Yes = 1
		No = 0
Ownership of house	ass_hous	Yes = 1
		No = 0
Ownership of telephone	ass_tele	Yes = 1
		No = 0
Ownership of radio	ass_radi	Yes = 1
		No = 0
Ownership of jewellery	ass_jewe	Yes = 1
		No = 0
Household worried if food will be enough.	hfias_1	Never = 0
		Rarely = 1
		Sometimes = 2
		Often = 3
Household eat preferred kinds of food.	hfias_2	Never = 0
		Rarely = 1
		Sometimes = 2
		Often = 3
Household eat just a few kinds of food	hfias_3	Never = 0
		Rarely = 1
		Sometimes = 2
		Often = 3
Household eat un-preferred food	hfias_4	Never = 0
		Rarely = 1
		Sometimes = 2

		Often =	3
Household member ate smaller meal	hfias_5	Never =	0
		Rarely =	1
		Sometimes =	2
		Often =	3
Household ate fewer meals in a day	hfias_6	Never =	0
		Rarely =	1
		Sometimes =	2
		Often =	3
Household had no food	hfias_7	Never =	0
		Rarely =	1
		Sometimes =	2
		Often =	3
Household member went to sleep hungry	hfias_8	Never =	0
		Rarely =	1
		Sometimes =	2
		Often =	3
Household member went whole day without food	hfias_9	Never =	0
		Rarely =	1
		Sometimes =	2
		Often =	3
Name of garden	name_gar		
Number of members in community garden	pple_gar		
Size of community garden (M^2)	size_gar		
Using fertilizer	fert_use	Yes =	1
		No =	0
Visited by extension officer	ext_offi	Not at all =	0
		Less frequent =	1
		Frequently =	2
Size of the farm is enough	siz_enou	Yes =	1
		No =	0
Using manure on the farm	man_use	Yes =	1

		No = 0
Irrigating the farm	irrigate	Yes = 1
		No = 0
Use hired labour on the farm	hire_lab	Not at all = 0
		Less often = 1
		Very often = 2
Experience animal damage	ani_dam	Yes = 1
		No = 0
Experience floods damage	flood	Yes = 1
		No = 0
Experience drought damage	drought	Yes = 1
		No = 0
Experience theft on garden	theft	Yes = 1
		No = 0
Experience pest and disease damage	pst_dse	Yes = 1
		No = 0
Have enough food from garden	foodenou	Yes = 1
		No = 0

Value of maize purchased last month	maizvalu
Value of maize received as gift last month	maizgift
Value of maize received as payment last month	maizpay
Value of maize from community garden last month	maizcomg
Value of maize from home garden last month	maizhome
Value of maize from own production last month	maizownp
Value of Millie meal purchased last month	mealvalu
Value of Millie received as gift last month	mealgift
Value of Millie received as payment last month	mealpay
Value of Millie received as payment last month	ricevalu
Value of rice received as gift last month	ricegift
Value of rice received as payment last month	ricepay
Value of bread purchased last month	bredvalu

Value of bread received as gift last month	bredgift
Value of bread received as payment last month	bredpay
Value of flour received as payment last month	flouvalu
Value of flour received as gift last month	flougift
Value of flour received as payment last month	flourpay
Value of breakfast cereal received as payment last month	cerlvalu
Value of dried peas purchased last month	drdpvalu
Value of dried peas received as gift last month	drdpgift
Value of dried peas received as payment last month	drdppay
Value of dried peas from community garden last month	drdpcomg
Value of dried peas from home garden last month	drdphome
Value of dried peas from own production last month	drdpownp
Value of potato purchased last month	potvalu
Value of potato received as gift last month	potgift
Value of potato from community garden last month	potcomg
Value of potato received as payment last month	potpay
Value of potato from home garden last month	pothome
Value of potato from own productionlast month	potownp
Value of tomato purchased last month	tomvalu
Value of tomato received as gift last month	tomgift
Value of tomato received as payment last month	tompay
Value of tomato from community garden last month	tomcomg
Value of sweet potato purchased last month	sptvalu
Value of sweet potato received as gift last month	sptgift
Value of sweet potato from community garden last month	sptcomg
Value of sweet potato from home garden last month	spthome
Value of *madumbe* purchased last month	madvalu
Value of *madumbe* received as gift last month	madgift
Value of *madumbe* from community garden last month	madcomg
Value of *madumbe* from home garden last month	madhome
Value of *madumbe* from own production last month	madownp
Value of oil purchased last month	oilvalu
Value of oil received as gift last month	oilgift
Value of pea nuts purchased last month	peanvalu

Value of pea nuts received as gift last month	peangift
Value of pea nuts received as payment last month	peanpay
Value of pea nuts from community garden last month	peancomg
Value of pea nuts from home garden last month	peanhome
Value of peanut butter purchased last month	pnbtvalu
Value of margarine purchased last month	margvalu
Value of margarine received as gift last month	marggift
Value of cheese purchased last month	chesvalu
Value of jam purchased last month	jamvalu
Value of fresh milk purchased last month	milkvalu
Value of sour milk purchased last month	maasvalu
Value of baby formula purchased last month	babyvalu
Value of milk powder purchased last month	mlkpvalu
Value of milk powder received as payment last month	mlkppay
Value of sugar purchased last month	sugvalu
Value of sugar received as gift last month	suggift
Value of sugar received as payment last month	sugpay
Value of meat purchased last month	meatvalu
Value of meat received as gift last month	meatgift
Value of meat received as payment last month	meatpay
Value of tinned meat purchased last month	tinmvalu
Value of offal purchased last month	ofalvalu
Value of offal received as gift last month	ofalgift
Value of chicken purchased last month	chicvalu
Value of chicken received as gift last month	chicgift
Value of chicken received as payment last month	chicpay
Value of eggs purchased last month	eggvalu
Value of fresh fish purchased last month	ffshvalu
Value of tinned fish purchased last month	tfshvalu
Value of pumpkin purchased last month	pumkvalu
Value of pumpkin received as gift last month	pumgift
Value of pumpkin received as payment last month	pumpay
Value of pumpkin from community garden last month	pumkcomg
Value of pumpkin from home garden last month	pumkhome

Value of green millies purchased last month	gmeavalu
Value of green millies from community garden last month	gmeacomg
Value of green vegetables purchased last month	gvegvalu
Value of green vegetables from community garden last month	gvegcomg
Value of green vegetables from home garden last month	gveghome
Value of carrots purchased last month	carrvalu
Value of carrots received as gift last month	carrgift
Value of carrots from community garden last month	carrcomg
Value of carrots from home garden last month	carrhome
Value of *imifino* purchased last month	imifvalu
Value of *imifino* from community garden last month	imifcomg
Value of *imifino* from home garden last month	imifhome
Value of *imifino* from own production last month	imifownp
Value of banana purchased last month	banvalu
Value of banana received as gift last month	bangift
Value of banana received as payment last month	banpay
Value of banana from community garden last month	bancomg
Value of banana from home garden last month	banhome
Value of apple purchased last month	applvalu
Value of apple received as gift last month	applgift
Value of citrus purchased last month	citrvalu
Value of citrus received as gift last month	citgift
Value of citrus from own production last month	citrownp
Value of soft drink purchased last month	sftdvalu
Value of soft drink received as gift last month	sftdgift
Value of soft drink received as payment last month	sftpay
Value of tinned fruit purchased last month	tfruvalu
Value of tinned fruit received as gift last month	tfrugift
Value of take a ways purchased last month	tawyvalu
Value of take a ways received as gift last month	tawygift
Value of meals given to guests last month	mltogval
Value of meals received from guests last month	mlfrgval

APPENDIX D
GROUP DISCUSSION RESPONSES

“Our relatives who have gone to work in the cities are the ones who finance most of our feeding by sending us money. Unfortunately we are never sure of when they were going to send us money for food. In many cases there jobs are temporary which means relying on them is only on temporary basis. Sometimes it takes even three months without receiving anything from them. This condition makes us very unsure if we shall have some money to buy food with in future”.

“Rains in our area are very unreliable. At least every year we must loose some of our crops due to lack of rains. Our crops rely totally on rain water since we do not have irrigation systems and the rivers are too far to practice bucket irrigation. Since we cannot tell the times of the rains, even planting time is not always certain”. This means that we can never be sure of what quantity of food we shall receive form the community gardens or even the home gardens.

“Our community gardens are very far from our household. We do not have somebody who guards the garden when we have ready crops. On many occasions we share our farm produces with those who come to steal from the gardens. In some cases it can be nearly a fifty – fifty sharing. This problem really makes us anxious if at all we will get any harvest from the gardens”.

“We do not have money to buy the kinds of food that we could prefer to eat since we are not employed and we rely on the little money that is send to us by our relatives who have gone to work in town”.

“We hear that the government is supplying food to other communities while our community has been forgotten so we just eat the few crops from our fields which is mainly a few vegetable types and that the super market foods are too expensive for us to buy. These markets are also too far from us even if we had some money to buy even a fruit”.

“Droughts are very common in our area and most of our vegetable crops are normally destroyed living us with only *madumbe*, potatoes and sweet potatoes as the only food crops that we rely on when such a situation occurs as these crops are able to resist drought. This really limits the number of different foods we can use in our diet.

“Most of the crops we grow are vegetables and all of them mature at the same time. So for a period of about two months we have plenty to eat while for the rest of the year there is nothing to eat because we can not store these vegetable crops and also selling these crops so that we can keep the money is difficult because everybody is having the same kind of vegetables at the same time”.

“We cannot get enough food from the gardens because we are many members for any given household. The gardens are limited in size and cannot be expanded” A household size of plot may measure as small as 20M X 5M which cannot be enough for our large number of members for each household in a given year”.

“The produce we get from the gardens cannot be the optimum since we do not use any current methods of crop production since we lack resources to buy things like fertilizers, insecticides and fungicides. We are not advised on any of the crop production methods as we are not visited by any agricultural officer.” We just plant and hope that we shall be able to get something out of it”.

“We loose so much of our community garden produce to pests and diseases, drought, floods and theft. The crops are also destroyed by animals since the gardens are not fenced. This means that we can never have all that has to come from the gardens and this explains why we shall always have little food to feed our families”.

“The rains in Maphephetheni are very low and cannot on its own raise a crop to maturity. At one or more stages of the crop growth we must supplement

rain water by practicing bucket irrigation from the rivers nearby. Sometimes the drought is so intense that the rivers dry away and in such cases we have a complete crop failure”.

APPENDIX E
HFIAS SCORE AND FOOD INSECURITY CATEGORY

	Coded Frequency of Food Insecurity Experience									Individual	Food Insecurity
Household	**Q1**	**Q2**	**Q3**	**Q4**	**Q5**	**Q6**	**Q7**	**Q8**	**Q9**	**HFIAS score**	**Category**
1	3	3	3	3	3	3	2	1	0	**21**	**4**
2	3	3	1	2	2	2	0	0	0	**13**	**4**
3	3	3	3	3	3	3	2	1	0	**21**	**4**
4	3	3	3	2	3	2	1	1	0	**18**	**4**
5	3	3	2	2	1	0	1	0	0	**12**	**4**
6	3	3	2	3	2	3	1	0	0	**17**	**4**
7	3	3	3	3	2	3	1	0	0	**18**	**4**
8	3	3	3	3	2	3	1	0	0	**18**	**4**
9	2	3	3	3	2	3	1	0	0	**17**	**4**
10	3	3	3	3	3	3	1	0	0	**19**	**4**
11	3	2	2	2	0	3	0	2	0	**14**	**4**
12	2	2	3	3	0	0	0	1	0	**11**	**4**
13	3	2	2	2	0	2	1	2	2	**16**	**4**
14	0	2	3	2	0	2	2	1	2	**14**	**4**
15	3	3	3	3	3	3	1	2	0	**21**	**4**
16	3	3	3	3	3	3	3	3	3	**27**	**4**
17	3	3	3	3	3	3	2	2	3	**25**	**4**
18	2	3	3	3	3	1	1	2	3	**21**	**4**
19	3	3	3	3	3	3	3	1	2	**24**	**4**
20	3	2	3	2	0	2	1	2	2	**17**	**4**
21	0	3	3	2	3	3	0	0	0	**14**	**4**
22	2	3	3	3	3	1	1	1	1	**18**	**4**
23	2	2	2	2	3	2	2	0	0	**15**	**4**
24	0	3	3	3	3	3	0	0	0	**15**	**4**
25	2	0	3	3	2	3	2	0	1	**16**	**4**
26	3	3	3	3	3	3	3	1	3	**25**	**4**
27	1	2	3	3	2	1	2	3	2	**19**	**4**
28	2	2	2	3	3	2	2	2	2	**20**	**4**
29	3	3	3	3	3	2	2	0	0	**19**	**4**
30	2	3	3	3	3	2	2	0	0	**18**	**4**
31	2	3	2	3	3	2	2	2	2	**21**	**4**
32	3	3	3	3	3	3	2	0	0	**20**	**4**
33	3	3	3	3	3	3	0	0	0	**18**	**4**
34	3	3	3	3	3	3	2	0	0	**20**	**4**
35	3	3	3	3	3	2	0	0	0	**17**	**4**
36	3	3	3	3	3	3	1	0	0	**19**	**4**
37	3	3	3	3	3	3	2	0	0	**20**	**4**
38	3	3	3	3	3	3	2	0	0	**20**	**4**
39	3	3	2	3	2	3	2	0	0	**18**	**4**
40	2	3	3	3	2	3	2	0	0	**18**	**4**
41	2	2	1	2	2	0	1	0	0	**10**	**4**
42	2	1	2	2	1	2	2	1	2	**15**	**4**
43	2	1	2	2	1	2	2	1	2	**15**	**4**
44	2	1	1	2	2	2	3	0	0	**13**	**4**
45	2	2	0	2	0	1	0	0	0	**7**	**3**
46	2	1	0	1	0	0	1	0	0	**5**	**4**
47	0	2	1	1	2	2	0	0	0	**8**	**3**
48	0	2	1	1	2	2	0	0	0	**8**	**3**
49	0	0	1	1	2	2	0	0	0	**6**	**3**
50	1	3	2	1	0	1	2	0	0	**10**	**4**
51	2	0	0	1	2	2	0	2	0	**9**	**4**
52	2	1	1	0	0	0	0	0	0	**4**	**2**
53	2	1	2	1	2	2	2	1	2	**15**	**4**
							Total HFIAS score			**859**	

Key:
Food Insecurity categories
Category 1: Food secure
Category 2: Mildly food insecure
Category 3 moderately food insecure
Category 4 Severely food insecure